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**In This Issue:**

*Sugar Cane Collecting in New Guinea During 1937:*

A resume is given of the likely centers of origin of the various sugar cane species. The history of previous cane collections in New Guinea is detailed in full and is accompanied by a map showing the regions where collections were made by some of the expeditions.

The findings of an expedition sent into the Mandated Territory of New Guinea by the Hawaiian Sugar Planters' Association in 1937 are described. This expedition collected only seed-bearing fuzz which was stored in airtight containers and later germinated under the quarantine regulations of the Experiment Station, H.S.P.A. Particular emphasis was placed on the species of *S. robustum,* for it was desired to increase the range of this species in the breeding collection. The expedition arrived during February of 1937 which is the start of the tasseling season for this country. Its explorations were centered in four geographical areas:

(1) The rivers of the Gazelle Peninsula on New Britain yielded some interesting new *S. robustum* material which was characterized by freedom from pith in the stalks and bristles on the leaf sheath. One clon common on the pumice slopes carried desirable characteristics of light tasseling habit and continuous growing ability.

(2) The islands of New Ireland and Lavongai: A three weeks' survey through this region yielded no new forms of *S. robustum* beyond those which had already been found on the Gazelle Peninsula.

(3) Plateau country: The rolling grassy plateau (elevation 5500 feet) at the headwaters of the Ramu River on the mainland of New Guinea was found to be populated with a wide assortment of *S. robustum, S. spontaneum,* and apparent intermediates between these two. The seedlings derived from these collections show unusual vigor and a wide range of growing habit.

(4) Coastal rivers of Northern New Guinea: Collections were made on the river banks and swamps bordering the Francisco and Markham rivers.

Varieties of *S. officinarum* were found in all the native villages from sea level to the plateau country. In nearly all cases these were low fiber, soft canes whose juice by the hand refractometer showed Brix readings of 10 to 15. However, two varieties were found with Brix readings over 20.

Fiji disease was common throughout the territory on both varieties of *S. officinarum* and *S. robustum*. Downy mildew was noted on a few clumps of *S. officinarum* growing near the headwaters of the Purari River (elevation 600 feet).

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*An Annotated List of the Fungi and Bacteria Associated With Sugar Cane and Its Products:*

The check list of sugar cane fungi prepared by E. L. Caum and published in 1921 by this Station has proved extremely useful as a reference to organisms attacking sugar cane in the various sugar producing countries. Since 1921 many new fungi have been determined and numerous changes have been made in the nomenclature and classification of the sugar cane fungi.

The authors, in preparing the annotated list of fungi and bacteria associated with sugar cane, have in general followed Caum's plan. The fungi are arranged in alphabetical order according to their scientific names. Each organism is briefly described and its geographic distribution, "insofar as reported on *Saccharum* spp.," is given. The name by which each disease is commonly known, e.g., eye spot, brown stripe, smut, etc., is given in italics on the right margin of the page under the species name of its causal organism.

The compilation of the revised list has been an arduous task and will be invaluable to pathologists throughout the world as a standard reference to sugar cane fungi and bacteria.

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# Sugar Cane Collecting in New Guinea During 1937*

By C. G. Lennox

## Introduction

Genes are the plant breeder's building blocks. His chances of producing a desired type of plant depend largely upon the range of genetic material he has to work with, and it follows that the greater the range of his breeding material the greater are his chances of success. The recognition of this fundamental principle has led the plant breeder to add to his breeding gardens as many types as possible of the plant family with which he is working.

The early breeders working with the sugar cane plant confined their efforts to crosses between varieties of *S. officinarum.* As time went on it was seen that resistance to certain diseases was not obtainable within this species alone. The workers in Java were the first to attempt inter-species crossing with an object of introducing resistance to Sereh disease by crossing *S. officinarum* with *S. barberi.* This line of attack not only yielded resistance to the disease, but was found to give additional vigor, the like of which had not been obtained in working within *S. officinarum.* Inter-species crossing has progressed apace since this time and today is the foundation of all sugar cane breeding.

## Origin of the Saccharum Species

Exploration work on many of the economic plants which are under study today has revealed that they have had their center of origin in some rather restricted region of the world. These centers are characterized by an exceptional abundance of varieties and forms. Distribution from these centers may be accounted for by migrations of man, where the plant was of economic importance to him, or by natural agencies such as birds and winds. It naturally follows, therefore, that as we recede from these centers of origin we find the plant in question expressed in fewer forms. With sugar cane, the center of origin for the genus as a whole appears to be extended over the large area sweeping westward and northward from New Guinea through the Dutch East Indies, Malaya, Indo-China, and India. The centers of origin for the species within the genus *Saccharum,* however, are more localized, and in some cases do not overlap. The following is an attempt to localize the centers of origin for the various species with the information which is at hand today.

*S. officinarum:* This species has held an important position in the life of primitive man living in the tropics and has been widely distributed with native migrations. It is therefore difficult to place the center of origin within a confined area, as today it is found in great variation in the native gardens extending from Hawaii westward through India. However, in view of the much greater variation found in the gardens of the primitive peoples of New Guinea and the East Indies one may assume that the origin was in this general region.

* Presented at the meeting of the International Society of Sugar Cane Technologists held in Baton Rouge, Louisiana, October 25 to November 5, 1938.

*S. spontaneum:* This member of the genus *Saccharum* holds little of economic importance to man, and its distribution could hardly be placed at his door. However, the seed of this variety is exceedingly viable and its distribution has likely been through the agency of true seed carried by wind or by migratory birds. Forms of *S. spontaneum* are found all the way from the Solomon Islands through New Guinea, East Indies, Philippine Islands, China, India, Afghanistan to North Africa.

*S. barberi* and *S. sinense:* The small-stalk, heavy-tillering varieties of British India, South China, Indo-China, and Malaya have been lumped under these two species. The classification is a crude one at best with no clearcut morphological characteristics and great variation in chromosome counts (3). India is likely the center of origin for this group.

*S. robustum:* In view of the present information, New Guinea appears to be the center of origin of this species. Here it is found growing on the mud banks of nearly all the rivers in a profusion of variation. There appears to have been only a little spread of this species westward (Tananggé of the Dutch East Indies and Teboe Salah of the Celebes), and this may have been done by primitive man who prizes it for building purposes. However, it is found in the wild state, but in reduced variation, from New Britain through the Solomons and New Hebrides (2), as far southeast as Fiji*. Some of this movement may have been with true seed carried by birds and some were likely carried as cuttings by migrating natives.

It is interesting to speculate on the relationship of *S. robustum* and *S. officinarum* in the evolutionary picture. Their similarities in stalk size, tillering habit, tassel structure, and chromosome number lead one to believe that they are related. Could they have come from a common ancestor whose hard rind, fibrous mutants have continued to survive in the wild, while the soft rind, juicy mutants were recognized by man and propagated under his care? If such was the case it is likely the varieties of *S. officinarum* are the result of a series of mutations selected for their easier chewing qualities. It is not likely that the varieties of *S. officinarum* as we know them today would have survived in the wild.

## The History of Cane Collecting in New Guinea

The sugar cane growers of Queensland, Australia, have long been aware of the wealth of varieties that may be found in the gardens of the primitive natives of New Guinea. Repeated expeditions (see map) have been sent out by that Commonwealth for the purpose of collecting cuttings from these native gardens and testing their merits for commercial cultivation of sugar.

The first record is that of Cowley's (3) collection made prior to 1895 and introduced into Australia by the Queensland Department of Agriculture. Eleven named varieties were in this collection, but apparently none of them were suitable for commercial cultivation as they do not appear in the literature of recent years.

The second expedition was made by Tryon in 1896 under the auspices of the Queensland Department of Agriculture. Seventy-two named clons were intro-

* The writer identified a native Fijian variety (Daruka) as of the *S. robustum* species. O. W. Stevensen of the Colonial Sugar Refining Company has since written that he has found eight varieties of *S. robustum* on Viti Levu. Three develop normal tassels and five are of the edible tassel type.

NEW GUINEA AND PAPUA
141°
144°
147°
150°
153°
0°
3°
6°
9°
12°
NORTH
SEPIK
RIVER
EAST
NEW
GUINEA
PAPUA
KAMU R.
MADANG
Mt. HAGEN 13120'
Grass Plateau Elev. 5500'
KAIAPIT
MARKHAM R.
LAE
SALAMAUA
STRICKLAND R.
KIKORI R.
FLY R.
DARU
GULF OF PAPUA
KAIRUKU
BUNA
KOKODA
PORT MORESBY
RIGO
TORRES STRAIT
MILNE BAY
SAMARAI
TROBRIAND ISLANDS
LAVONGAI
NEW IRELAND
RABAUL
GAZELLE PENIN.
TORIU
TOBU R.
NEW BRITAIN
SOHANA
LEGEND - SHOWING THE REGIONS VISITED DURING THE VARIOUS SUGAR CANE COLLECTION EXPEDITIONS INTO NEW GUINEA
© = COWLEYS Collection - before 1896
Ⓣ = TRYON " 1896
▲-▲-▲ = CARNE " 1914
●●● = U.S. SUGAR EXP. " 1928
XXX = H.S.P.A. " " " 1937

duced, which were given N. G. serial numbers. N. G. 15 (Badila) is the most noteworthy of this group and still occupies a very important place in the variety census of the Australian sugar industry. N. G. 24 (Goru) and N. G. 22 (Mahona) are individuals which have also played a minor part in the commercial sugar world.

A third introduction was made in 1912 by the Queensland Bureau of Sugar Experiment Stations. A total of 119 clons were collected by Wells for this introduction. Only six were distributed by the experiment station for field trials, but none are in evidence today in commercial plantings.

The Colonial Sugar Refining Company sponsored an expedition under Carne in 1914. He collected cuttings from 103 clons. Three of these because of their disease resistance are still grown in commercial areas, i.e., 14 N. G. 190 (Oramboo), 14 N. G. 241 (Nanemo), 14 N. G. 124 (Korpi). Carne again found Badila, which he brought back under the number 14 N. G. 188.

In 1928 the United States Sugar Cane Expedition under E. W. Brandes, J. Jeswiet, and C. E. Pemberton, collected cuttings of 288 clons (4) over a wide range of territory. The collection not only included varieties of *S. officinarum,* but also had representatives of *S. spontaneum* and *S. robustum.* This is the first record of the latter species and first recognition of the wild river canes of New Guinea as belonging to the genus *Saccharum.* Representatives of this collection are found in the breeding gardens of the Colonial Sugar Refining Company at Macknade, Queensland, and Rarawai, Fiji, as well as in the U. S. D. A. collection at Canal Point, Florida. This expedition was the first to enter the New Guinea territory with an eye to securing breeding material as well as clons which would be suitable for commercial production of sugar.

The Hawaiian Sugar Planters' Association introduced in 1929 seed-bearing fuzz collected by Mr. Pemberton from *S. robustum* growing in the vicinity of Rabaul, New Britain. One seedling was raised from this, which appears in the cane breeding gardens of this Association. Mr. Pemberton also sent cuttings of the Rabaul *S. robustum* to the Colonial Sugar Refining Company in Australia.

In 1930 the Hawaiian Sugar Planters' Association made another introduction of seed-bearing fuzz of *S. robustum* which P. Leigh collected along the banks of the Laloki River near Port Moresby, Papua. Some 300 seedlings were retained for their breeding collection from the many thousands which germinated.

### 1937 Expedition Into the Mandated Territory of New Guinea

The breeding work in Hawaii is carried on along the same lines as that in other countries in which the strategy of inter-species crossing has been used to establish characteristics most urgently required for the systems of agriculture practiced. As an example, under the regions of low sunlight and heavy rainfall, the characteristic of heavy tillering for weed control has been of paramount importance. *S. spontaneum* and *S. sinense* have been valuable in crossing with *S. officinarum* to give this characteristic. For regions of heavy tonnage and long growing periods the importance of stalk durability and second-season growth has been emphasized by the failure of the *S. spontaneum* blood to transmit these characteristics. On the other hand the seedlings derived from the *S. robustum* combinations show a high proportion of hard durable canes. It was with this information and the natural de-

sire of the geneticists to increase their range of genes that an expedition was organized under the leadership of Mr. Pemberton and the writer to search the Mandated Territory of New Guinea for all forms of sugar cane which would be of interest in enlarging the scope of the breeding collection. Particular emphasis was to be placed on the species *S. robustum.*

The expedition set forth in time to arrive in New Guinea at the beginning of the tasseling period (February). Since the collection of breeding material was our main objective, a wider assortment could be had by bringing in seed-bearing fuzz rather than cuttings. The Experiment Station's quarantine facilities permit the handling of only 16 varieties at a time from cuttings, while three or four thousand seedlings from true seed can be accommodated. Moreover, the risk of introducing disease or insect pests is greatly reduced with true seed.

A brief description was made of all clons at the time the tasseled material was collected. This aided in avoiding duplication as it was often found that a clon had been widely distributed by natives.

The techniques used in collecting and preserving the fuzz were modifications adopted from the routine used in the ordinary crossing work in Hawaii. Wherever tassels were found sufficiently mature to harvest immediately they were cut and then dried for two days in paper bags before stripping off the fuzz. This dried fuzz was immediately packed in small gauze bags that were in turn placed in friction top, airtight tins. A small quantity of calcium chloride (approximately 5 grams $CaCl_2$ per 10 grams of fuzz) was added to each tin. The covers were sealed with paraffin and where cold storage facilities were available they were stored at temperatures not lower than 38 degrees F. It often happened that the tassels were not at the right stage for harvesting. In such cases the stalk bearing the tassel was cut at a point about four feet below the last green leaf and the ends immersed in a weak solution of sulfurous and phosphoric acids. Sections of automobile inner tubes vulcanized at one end made convenient receptacles for carrying these bundles of tasseled stalks out of difficult places and back to headquarters. At headquarters the bundles were opened and the stalks stood in this solution (Fig. 1) until the tassels were ready for harvesting.

The area covered during three months in the Territory of New Guinea may be divided into four geographical regions, and will be discussed accordingly. The material collected has passed through the six-month quarantine period in an insect-proof greenhouse and is now planted in our quarantine field on the island of Molokai. The plants are old enough now for us to make general observations on the relative merits of the different collections, so in discussing each region general observations will be made on the appearance of the seedlings in the quarantine plot.

1. *Gazelle Peninsula, New Britain:* The Gazelle Peninsula is the northern fourth of the island of New Britain and is approximately 50 miles long by 50 miles wide, with Rabaul situated on the northern tip. An automobile road makes accessible an area within 30 to 40 miles of the town; elsewhere trading schooners must be used as transport. The whole peninsula is mountainous, the tallest peak being about 4500 feet.

The lower reaches of the three large rivers which drain this area were found to be populated with *S. robustum,* while on the upper reaches where the jungle overhangs the river it was found that the wild cane was unable to survive. Each river

had its distinctive type, although in general characteristics they were much alike. All tended to hold their trash. The stalks of the Toriu and Warangoi rivers forms were quite free of pith and the leaf sheaths free of spines. These characteristics are greatly desired as most of the *S. robustum* in the collection at present have these undesirable qualities. The forms found on each river were so alike morphologically that it would appear that they had been derived from a single clon—clumps of which had been torn away by floods and had been transplanted to the lower reaches. This similarity cannot be attributed to homozygosity as the seedlings which have been derived from them show a wide range of variation. At the present time the seedlings of the Toriu River collection show a high proportion of desirable types many of which approach the noble canes in stooling habit and leaf size.

The forms found growing away from the rivers cover two general classes, an erect, self-stripping, tall-growing, light-tasseling type (N. B. 2 and N. B. 3), and a trashy, lodging type (N. B. 1 and N. B. 4). The former, N. B. 3, was most common and was highly prized in the construction of native houses, fences, and as a

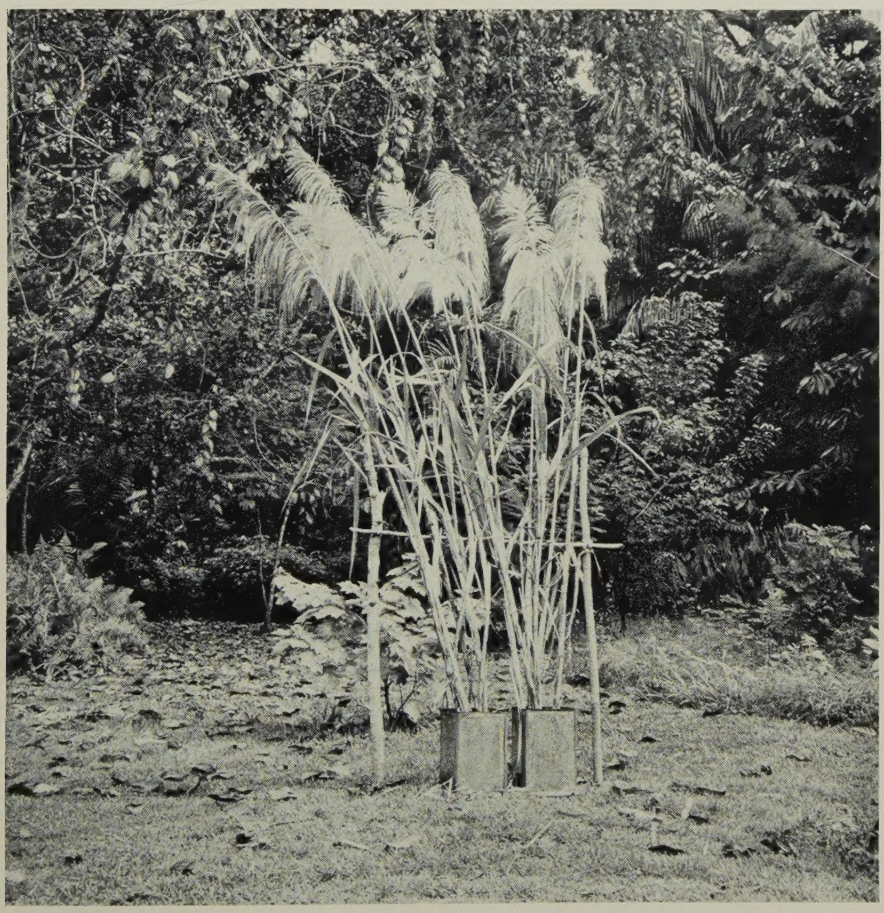

Fig. 1. Tassels which were not ready for harvest were brought back to headquarters on their stalks. These were kept living in a weak solution of sulfurous and phosphoric acids until the florets began to shatter. Photo by C. E. Pemberton.

soil binder along road fills. The light-tasseling and continuous-growing quality of this clon made it particularly attractive. In some sheltered areas (Fig. 2) straight, erect stalks 18 feet long were found which showed no cessation of growth. The seedlings derived from this clon are above average in growth and show a fair amount of variation in habit, although in general, they are heavy stoolers and semi-erect.

2. *The Islands of New Ireland and Lavongai:* These two islands lie to the north of New Britain. New Ireland is easily accessible for exploration because it has a road which runs 150 miles of its total length of 200 miles. Lavongai is workable only by boat or native trail.

The island of Lavongai is drained by innumerable rivers which are navigable by canoe for a mile or so inland, beyond which they break into rapids and wind through dense forest cover. The banks and mud flats bordering the lower reaches of all the rivers along the southern coast were covered with a single clon of *S. robustum,* which, curiously enough, was the same as found in native villages around Rabaul. This same clon (N. B. 3) was also found in many of the villages along

Fig. 2. Durability and continuous-growing ability of the stalks are some of the desirable characteristics furnished by *S. robustum.* The clon (N. B. 3) pictured above is also a light tasseler. Photo by C. E. Pemberton.

the New Ireland coast and in one isolated abandoned garden on the Lalet Plateau (elevation 2000 feet). The stalks of this clon are symmetrical, fibrous, and dry. They make the best building material of any of the *S. robustum* seen and this quality had apparently been recognized by the natives. A few stools of another variety (N. I. 1) were found on the Ungat River amid the usual run of N. B. 3. It is interesting to note that another isolated clump of the same clon was found also in a grass area some miles inland from the village of Lawun on New Ireland. How they arrived at these two widely separated and inaccessible places is interesting speculation.

New Ireland is a long narrow island with a backbone of limestone mountains rising to 3000 feet. Rain falling on the mountains disappears into underground channels and suddenly makes its appearance near the coast in the form of rushing torrents gushing from caves. In no case was cane observed growing wild along the banks of these rivers. Similar observations on the absence of wild cane in limestone country were made along the eastern coast of the Gazelle Peninsula.

Fig. 3. Large areas of *S. robustum* were found on the river flats of the Ramu Plateau (elevation 5500 feet). These thickets were made up of a population of many hundreds of varieties. Photo by C. E. Pemberton.

The search on these two islands yielded no new varieties of *S. robustum.* The native chewing canes were also conspicuously absent because the natives have long been under the influence of the white settlers and have learned to use the trade-store sugar.

3. *Plateau Country on New Guinea:* The island of New Guinea is approximately 1500 miles long by 400 miles wide, the surface almost entirely cut up with mountain ranges, some of which tower to over 15,000 feet.

Our objective on this island was to reach the large, open, grass plateau (elevation 5500 feet) at the headwaters of the Ramu River. We had assurance that the wild cane was in tassel. The Administrative Officers of the Territory of New Guinea made the trip possible by granting permission to enter this "uncontrolled area" and throwing open the facilities of the government outpost in this region. An airplane was used to cover the long distance into the interior, while native trails were used in searching the country within a fifteen-mile radius of the landing field. The climate on this plateau is nearly temperate although only three degrees south of the Equator.

Fig. 4. The grassy meadows of the Ramu Plateau (elevation 5500 feet) were populated with occasional clumps of what appeared to be an intermediate between *S. robustum* and *S. spontaneum.* Photo by C. E. Pemberton.

*S. robustum* was found flourishing on all the river flats and swampy ground of this plateau country. In some cases (Fig. 3) it would be massed in areas of 25 acres or more and growing in such a tangled mass that it was nearly impossible to penetrate. The natives select the interior of these *S. robustum* thickets to build their villages as the dense cane offers them a ready retreat in case of attack by neighboring tribes. These *S. robustum* thickets were made up of a population of hundreds of varieties, a situation quite different from that of the flats on the lowlands where apparently one or two clons dominated each of the rivers. Hours of examination revealed only occasional stalks with identical characteristics and these usually came from the same stool. Except for isolated clumps of *S. spontaneum* the population was primarily of the *S. robustum* species or what appeared to be intermediates between *S. spontaneum* and *S. robustum*.

Only occasional clumps of these intermediates (Fig. 4) were found on the grassy meadows above the wet river flats. Their continued existence in these locations was a precarious one because it is the custom of the natives to burn off the grasslands in dry weather in order to catch rodents upon which they depend for the meat

F'g. 5. *S. spontaneum* was the only species which grew on the dry ridges. It was found in considerable variation in random clumps throughout the plateau country.

portion of their diet. *S. spontaneum* (Fig. 5) was the only species which grew on the dry ridges. It was found in considerable variation in random clumps throughout the plateau country.

The seedlings derived from the collections made on this plateau country are among the most interesting in the quarantine field at present. They are extremely variable in growth habit giving us the full gamut from small-stalk, heavy-stooling types to types with sparse stooling and with rank-growing primaries. While in the greenhouse, many stalks of one of these crosses (Fig. 6) measured 17 feet from base to last visible leaf collar at the end of the six-month growing period. This was nearly twice the growth made by seedlings from fuzz collected on the lowlands.

The survey of the Ramu Plateau included a patrol over the divide and down into the headwaters of the Purari River, which drains into the Gulf of Papua. The wild cane pattern was much the same as that found on the other side of the divide. The natives, however, were more advanced agriculturally and their cultivated gardens were many acres in extent. Large gardens of sweet chewing canes of *S. officinarum* were found in each village.

Headquarters were moved to the town of Wau, the center of the gold mining district, after the completion of the survey of the plateau country. Here at an elevation of 2000 feet the Bulolo River winds through steep forested gorges. The occasional river flats were covered with a heavy growth of *S. robustum*. Variation in these *S. robustum* thickets was not as wide as was found on the plateau. Varieties of *S. spontaneum* were common on grassy clearings away from the river and intermediates between the two species were again found wherever moisture was sufficient. The seedlings from this region are characterized by heavy waxing of the

Fig. 6. The seedlings from some of the collections on the Ramu Plateau measured seventeen feet in length after six months' growth in the quarantine house. Each seedling was planted in a gallon fruit tin and received no fertilizer during this period. Photo by J. P. Martin.

stalks and long bristles solidly cover the leaf sheaths. In the quarantine field they show a high degree of variability from narrow-leaf types to broad-leaf types. A number have both surfaces of their leaves covered with a fine soft down.

4. *Coastal Rivers of Northern New Guinea:* The river banks and swamp areas of the lowlands are covered with dense thickets of wild cane. Here the terrain had not divided the *S. spontaneum* and *S. robustum* species as it had in the upper lands, for both were growing in confusion in these areas. The seedlings arising from these collections are on the whole above average, and show a high degree of variability in conformation and stooling habit. A number have unusually broad and thick leaves.

## S. Officinarum in the Mandated Territory of New Guinea

Sugar cane for chewing purposes is one of the essential components of the native's diet. No garden is complete without its few clumps of edible cane which are carefully tended. The native has selected in the direction of low fiber and softness with a result that most of the varieties would deteriorate quickly if allowed to lodge. To prevent this the native drives a stout pole alongside each stool and lashes the stalks to it. Usually 8 to 12 sticks are allowed to grow and these are kept free of trash.

The canes in every garden were carefully examined with the object of finding individuals which would be suitable for commercial conditions. Hand refractometer readings were made on all varieties which appeared to have any promise. In nearly all cases the canes were extremely soft and juicy, but the Brixes would only range from 10 to 15 in the mature section of the stalk. However, two varieties were found in the villages of the plateau country where the Brixes read between 20 and 22 and the conformation and hardness of stalk appeared quite suitable for commercial conditions. It was necessary to reject one of these because of Fiji disease, but cuttings of the other (N. G. 6) were taken.

Tasseling in these native gardens was something of rare occurrence and in only three cases were tassels found, and here it was noted that the natives followed the practice of breaking them off soon after their emergence. This might in part explain the total absence of any stools of cane which could have been construed as natural hybrids between *S. officinarum* and either *S. spontaneum* or *S. robustum.* Moreover, it is hardly likely that the natives would foster the growth of any such hybrids since they would be useful neither as chewing canes nor for building purposes.

## Edible Tassel Varieties

A group of canes which fail to form normal tassels is common throughout New Guinea. Like the cauliflower this type produces an edible head of malformed, condensed flowers and branches that fail to emerge. On removal from the sheath it appears as a mealy mass. The natives use it as a vegetable, boiling or roasting it in its enclosing leaf sheath before eating. In all cases these varieties closely resembled *S. robustum* in all morphological characters. They are hardy, vigorous growers, and quite capable of competing with the jungle. The fewness of the clons lead one to believe that they may be mutants of *S. robustum* that were noticed by the natives

and propagated asexually. The distribution of edible tassel varieties extends from Fiji through New Guinea into the Dutch East Indies.

## Diseases of Sugar Cane Observed

Fiji disease was found throughout the Territory of New Guinea. Symptoms of the disease could be found in nearly every native garden of varieties of *S. officinarum* from sea level to those in the plateau country at elevations of over 5500 feet. It was also found on numerous clumps of the edible tassel varieties along the coastal villages and in one case in the mountainous country of the gold region. Some of the varieties of *S. robustum* growing along rivers of the lowlands were also found carrying this disease. Downy mildew was noted on a few clumps of *S. spontaneum* growing along the headwaters of the Purari River (elevation 6000 feet).

None of the other diseases common to sugar cane were observed during this survey.

## Acknowledgment

Every phase of the three months' work in this territory was materially assisted by the wholehearted cooperation of the Administrative Officials of the Territory of New Guinea, and particularly by G. H. Murray, Director of Agriculture, and his staff. We are also indebted to the many hospitable coconut planters and to others who supplied us in many ways with assistance.

## Literature Cited

(1) Braemer, G., 1934. De Cytologie van Het Suikerriet 7de Bijdrage. Archief voor de Suikerindustrie in Nederlandsch Indie, Vol. 42, Part II, Mededeelingen No. 5, pp. 141-166.

(2) Brandes, E. W., and Sartoris, G. B., 1936. Sugar Cane: Its origin and improvement. U.S.D.A. Yearbook of Agriculture, pp. 561-623.

(3) Easterby, H. T., 1926. Varieties of sugar cane in Queensland. Queensland Bureau of Sugar Experiment Stations, General Series Bulletin No. 2, 37 pages.

(4) Typewritten copy of complete collection of cane collected by United States Sugar Expedition, 1928.

# An Annotated List of the Fungi and Bacteria Associated With Sugarcane and Its Products

By

JOHN A. STEVENSON, *Senior Mycologist, Division of Mycology and Disease Survey,* and R. D. RANDS, *Senior Pathologist, Division of Sugar Plant Investigations, Bureau of Plant Industry, United States Department of Agriculture.*[1]

Caum[2] prepared and issued in 1921, under the auspices of the Hawaiian Sugar Planters' Association, "A contribution to a check-list of sugar cane fungi." This list served a useful purpose in bringing together accumulated information available at the time on the subject. During the seventeen years that have elapsed since the publication of Caum's list, many additions have been made from the several cane-sugar producing regions of the world and also many changes have been proposed in the nomenclature of previously recorded species, making a revision desirable.

In preparing this list Caum's plan has been followed in the main, with certain modifications and additions. The alphabetical plan is adhered to for ease of reference. Recognized species names are set in caps and small caps, synonyms in italics. Only those synonyms are cited which will be found in sugar-cane disease literature. Space limitations would not permit complete synonymy. The original place of publication is given for each accepted species name, together with the corresponding reference to Saccardo's Sylloge Fungorum. For the more important species a limited number of pertinent references have been included. The family to which each species belongs is recorded following the system of classification of Clements and Shear, The Genera of Fungi, 1931. Essential characters of the organism itself, together with its recorded geographical distribution, are given. The latter records relate, of course, only to the distribution insofar as reported on *Saccharum* spp.

The comprehensive works of Bell, Butler, Caum, Cook, Wakker and Went, and many others have been freely drawn on in compiling this account of sugarcane fungi and bacteria. The host index of the fungus literature of the world maintained by the Plant Disease Survey of the Bureau of Plant Industry, United States Department of Agriculture, constitutes an invaluable background from which the list has been prepared. However, no claim for completeness is made. Many species of bacteria, fungi, and yeasts reported, for example, in connection with the commercial fermentation industries are purposely omitted, the object being, in this instance, to record only the more extensively studied ones concerned in raw sugar deterioration and sugar-house sanitation.

No new names nor new combinations are proposed, although the work has revealed a number of the latter that might well be made for the sake of uniformity.

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[2]Bulletin III (Bot. Ser.) Part 1, pp. 66-97, 7 figs. 1921.

ACANTHORHYNCHUS LIGNORUM Shear, Bull. Torr. Bot. Club 24:313. 1907. Shear, Bur. Plant Ind. Bull. 110:26-30, pl. III (figs. 12-22). 1907. Sacc., Syll. Fungorum 22:300. 1913.

*Sphaeriaceae.* Perithecia subepidermal, long beaked, with septate paraphyses; asci 8-spored; spores 1-celled, brown, with gelatinous sheaths, 24-32 × 12-20 μ. Reported on cane leaf in damp chamber. Barbados.

ACREMONIELLA ATRA (Cda.) Sacc. Syll. Fungorum 4:302. 1886. Ferraris, Flora Italica Crypt. Fasc. 6:268, fig. 76. 1910. Spegazzini, Rev. Agron. y Vet. 2:249. 1896. *Acremonium atrum* Cda., Icones Fung. 1:11, tab. III (fig. 168). 1837.

*Dematiaceae.* Forms a delicate white mycelial layer with dark, ovate-ellipsoid conidia, 20-26 × 16-20 μ, borne singly on short erect conidiophores. On dead and dying leaves and culms. Argentina.

*Acremonium atrum* Cda. See *Acremoniella atra* (Cda.) Sacc.

ACROSTALAGMUS ALBUS Preuss, Linnaea 24:126. 1851. Sacc., Syll. Fungorum 4:163. 1886. Spegazzini, Rev. Agron. y Vet. 2:247. 1896.

*Moniliaceae.* Reported by Spegazzini as the conidial stage of *Melanospora globosa* Berl. (q. v.) developed in cultures, but not found on cane in the field. The conidial size given (9-12 × 2.5-4 μ) is much larger than the original description calls for (3.4 × 1-1.5 μ). Argentina.

ACROSTALAGMUS ALBUS Preuss var. DICHOTOMA Speg., Anal. Mus. Nac. Buenos Aires 6:333. 1899. Sacc., Syll. Fungorum 16:1037. 1902.

*Moniliaceae.* White mold on heaps of decaying leaves. Conidia capitate, continuous or 1-septate, hyaline, fusoid or ovate, 10-16 × 4-6 μ. Argentina.

ACROSTALAGMUS CINNABARINUS Cda., Icones Fung. 2:15, pl. 10 (fig. 66). 1838. Sacc., Syll Fungorum 4:163. 1886. Spegazzini, Rev. Fac. Agron. y Vet. 2:247. 1896.

*Moniliaceae.* Powdery, cinnabar colored conidial masses; conidia borne in globose heads on hyaline verticillately branched conidiophores, 3-4 × 1.5 μ. On rotten leaves, culms and other debris. Puerto Rico and doubtless in all cane-growing regions.

ACROSTALAGMUS GLAUCUS Fawcett, Rev. Ind. y Agric. Tucuman 13:45, 1 fig. 1922.

*Moniliaceae.* Conidia agglomerated in heads, ovate-ellipsoid, hyaline, 4-5 × 2.5-3 μ. Commonly present in rotting canes. Argentina.

ACROSTALAGMUS SACCHARI Fawcett, Rev. Ind. y Agric. Tucuman 13:45, 1 fig. 1922.

*Moniliaceae.* Conidia in heads, ovoid or oblong-ellipsoid, hyaline, 3.5-4 × 2-2.5 μ. An active agent in rotting canes left after harvesting. Argentina.

*Acrothecium* sp. See *Curvularia*

*Acrothecium lunatum* Wakker See *Curvularia lunata* (Wakker) Boedijn

ACTINOMYCES sp.

*Actinomycetaceae.* Isolated from canes attacked by top rot. Uganda. Not considered causative.

Aerobacter aërogenes (Kruse) Beijerinck, Centralbl. f. Bakt. Abt. II, 6:193. 1900.

*Bacteriaceae.* A widely distributed saprophyte found by Wolzogen Kühr associated with normal and Seréh-diseased cane. Java.

Allantospora radicicola Wakker, Arch. v. Java Suikerind. 4:892-6, pl. 19. 1896. Wakker and Went, De Ziekten van het Suikerriet op Java, pp. 179-183, 194, pl. 24. 1898. Sacc., Syll. Fungorum 14:1043. 1899.

*Moniliaceae.* Conidiophores erect, septate; conidia 1-2 septate, allantoid, 10-28 × 4 μ, capitate. Reported as parasitic on young cane roots in Java, and "a general cane saprophyte" in Hawaii. Possibly occurs in Surinam.

*Allantospora sacchari* ex Cooke, Proc. Int. Soc. Sugar Cane Tech. (4) Bull. 128:4. 1932. *Nomen nudum.*

Alternaria tenuis Nees, Syst. der Pilze u. Schwämme, p. 82, fig. 68, 1817. Sacc., Syll. Fungorum 4:545. 1886. Spegazzini, Rev. Agron. y Vet. 2:252. 1896. Mason, Annotated Account Fungi Received at Imper. Bur. Myc. II (fasc. 1), pp. 20-22. 1928.

*Dematiaceae.* Conidia single or in chains, long beaked, muriform, dark, 20-50 × 10-15μ (average), but variable. A group of forms or a species complex. Greenish brown to black mold as a common saprophyte on dead and dying leaves and canes, Puerto Rico, Argentina, India, and doubtless in all cane regions. *Alternaria* sp. isolated from roots, Louisiana, "but probably of no significance in root disease complex."

*Amoebosporus saccharinum* Cook See *Plasmodiophora vascularum* Matz

*Amoebosporus vascularum* Cook See *Plasmodiophora vascularum* Matz

*Anthostomella paraguayensis* Speg. See *Rosellinia paraguayensis* Speg.

Apiospora camtospora Penz. and Sacc., Malpighia 11:398. 1897. Sacc., Syll. Fungorum 14:534. 1899. Penzig and Sacc., Icones Fung. Javanicorum, p. 12, pl. 9 (fig. 4). 1904. Theissen and Syd., Ann. Myc. 13:421. 1915.

*Dothideaceae.* Black, linear stromata, 1 mm long, subepidermal; asci 8-spored; spores 35-38 × 9-10 μ.

On dead and dying leaves. Philippine Islands, Java, Burma. Clements and Shear, Genera of Fungi, consider *Apiospora* synonymous with *Scirrhia.*

Aposphaeria (?) bergii Speg., Rev. Agron. y Vet. 2:240. 1896. Sacc., Syll. Fungorum 14:894. 1899.

*Phomaceae.* Numerous black, membranous, superficial pycnidia; conidia ellipsoid, 5-7 × 3 μ. Produces indefinite yellow areas on young unfolding leaves. Argentina.

Arcyria cinerea (Bull.) Pers., Syn. Meth. Fung., p. 184. 1801. Macbride and Martin, The Myxomycetes, p. 271, pl. XVII. 1934.

*Arcyriaceae.* Sporangia stipitate, gray; stipes 0.2-2 mm long; spores hyaline, 6-8 μ. On cane trash. Puerto Rico, Java.

Arcyria denudata (L.) Wettstein, Verh. Zool.-Bot. Ges. Wien 36:585. 1886. Macbride and Martin, The Myxomycetes, p. 273, pl. XVIII. 1934.

*Arcyriaceae.* Sporangia stipitate, crimson, weathering to reddish brown or brown; spores red in mass, 6-8 μ. On cane trash. Puerto Rico.

ARMILLARIA sp.

*Agaricaceae.* Typical black rhizomorphs produced beneath lower leaf sheaths. Associated with the root disease complex. Tanganyika. See *A. mellea.*

ARMILLARIA MELLEA (Vahl) Fr., Syst. Myc., p. 30. 1821. Sacc., Syll. Fungorum 5:80. 1887. Wallace, E. Afric. Agric. Jour. 1:183. 1935.

*Agaricaceae.* Pileus 3-10 cm broad, oval to subhemispherical, finally plane, normally honey-colored, but varying to yellowish-brown or rusty brown; gills adnate or decurrent, yellowish; stipe 5-15 cm long; veil well developed; spores elliptical-ovate, hyaline, smooth, 8-9.5 × 5-6.5 μ. Associated with root disease. Tanganyika.

ARTHOBOTRYS SUPERBA Cda., Prachtfl. p. 43, pl. XXI. 1839. Sacc., Syll. Fungorum 4:181. 1886. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:222, pl. XXX (figs. 7-9). 1917.

*Moniliaceae.* Forms a white to pinkish mold; conidiophores inflated at septa; conidia borne in clusters at the septa, 1-septate, hyaline, 15-30 × 8-15 μ. On dead and dying leaves and stalks. Puerto Rico, Argentina.

ARTHRINIUM SACCHARICOLA Stevenson, Jour. Dept. Agric. P. Rico 1:223, pl. XXIX (figs. 1-3). 1917. Sacc., Syll. Fungorum 25:771. 1931.

*Dematiaceae.* Small black masses on dead leaf blades; fertile hyphae erect, with numerous thick dark septae; conidia sessile, borne spirally around conidiophores, 7-8 × 4-5 μ. Puerto Rico.

ASPERGILLUS

In addition to the species discussed hereafter, various unnamed forms have been reported by pathologists and others working on sugar deterioration, root rot, and other cane problems, Louisiana, Hawaii, Puerto Rico. Following Thom and Church *(The Aspergilli)* and other workers, *Aspergillus* is used rather than *Eurotium* for these fungi.

ASPERGILLUS ARGENTINUS Speg., Rev. Agron. y Vet. 2:245, 1896. Sacc., Syll. Fungorum 14:1046. 1899. *Eurotium argentinum* Speg., Rev. Agron. y Vet. 2:228. 1896. Sacc., Syll. Fungorum 14:463. 1899. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:212. 1917.

*Moniliaceae.* Gray mold on cut cane leaves and cane trash. Argentina, Puerto Rico. Perithecia yellow, 50-80 μ in diameter; spores hyaline, globose or ellipsoid, 4-5 × 3-4 μ. Thom and Church (The Aspergilli, p. 116. 1926) state "this form apparently belongs in the *A. glaucus* group, but since characters listed are insufficient to identify, the name should be deleted unless rediscovered."

ASPERGILLUS CANDIDUS Lk., Observationes I, p. 14. 1809. Sacc., Syll. Fungorum 4:66. 1886. Spegazzini, Rev. Agron. y Vet. 2:246. 1896. Thom and Church, The Aspergilli, p. 157. 1926.

*Moniliaceae.* White mold on dead cane leaves. Argentina. *(A. candidus* group of Thom and Church).

Aspergillus flavipes (Bainier and Sartory) Thom and Church, The Aspergilli, p. 155. 1926. *Sterigmatocystis flavipes* Bainier and Sartory, Bull. Soc. Myc. France 27:90-96, pl. III (figs. 1-6). 1911.

*Moniliaceae.* Heads white, stalk walls yellow. A mold on sugar products. Louisiana. (*A. flavipes* group of Thom and Church).

Aspergillus flavus Lk., Observationes I, p. 16. 1809. Sacc., Syll. Fungorum 4:69. 1886. Thom and Church, The Aspergilli, pp. 203-7. 1926.

*Moniliaceae.* Flavus-oryzae (yellow-green) group. On dead leaves and leaf sheaths, Egypt, Puerto Rico; on baled bagasse, Louisiana; and on sugar, Java, Louisiana. A form (*A. parasiticus* Speare, Hawaiian Sugar Planters' Exp. Sta. Path. Ser. Bull. 12:38. 1912) on cane mealy bugs. Hawaii, Puerto Rico, Demerara.

Aspergillus fumigatus Fres., Beitr. z. Myk., p. 8, pl. 10 (figs. 1-11). 1850-3. Sacc., Syll. Fungorum 4:65. 1886. Thom and Church, The Aspergilli, pp. 128-9. 1926.

*Moniliaceae.* *Aspergillus fumigatus* group. Colonies green to dark green or nearly black; conidiophores up to 300 × 2-8 μ; sterigmata in one series; conidia dark green in mass, globose, 2-3.5 μ. On sugar and piles of bagasse. Louisiana.

Aspergillus herbariorum (Wiggers) Fischer *in* Engler and Prantl, Die Naturl. Pflanzenf. Teil 1, Abt. 1, p. 301. 1896. Thom and Church, The Aspergilli, p. 106. 1926. *Eurotium herbariorum* Lk., Observationes, p. 31, pl. 2 (fig. 44). 1809. Sacc., Syll. Fungorum 1:26. 1882.

*Moniliaceae.* *Aspergillus glaucus* group. Conidia ashy green to olive and greenish-black in age, oval to elliptical, 6.5-7.5 × 9.5-11 μ. Sulphur-yellow, globular perithecia; ascospores with furrows and crests, 6.6-9.6 × 5.8-7.5 μ. Common on dead leaves and other cane debris, particularly on herbarium specimens. Puerto Rico and probably general.

Aspergillus nidulans (Eidam) Wint., *in* Rabh. Krypt. Flora 2 Aufl., Bd. 1, Abt. 11:62. 1887. Thom and Church, The Aspergilli, pp. 137-9. 1926.

*Moniliaceae.* *A. nidulans* group. Colonies white to yellowish-green; conidiophores more or less flexuous, cinnamon brown, 50-200 × 3-5 μ, with primary and secondary sterigmata; conidia globose, greenish, smooth or rough, 3-4 μ; perithecia globose, 200-300 μ diam.; ascospores purple-red, with equatorial band, 4 × 5 μ (average). On sugar. Louisiana.

Aspergillus niger v. Tiegh., Ann. Sci. Nat. Bot. ser. 5, 8:240. 1867. Thom and Church, The Aspergilli, pp. 167-170. 1926. *Sterigmatocystis niger* v. Tiegh., Bull. Soc. Bot. France 24:102-103. 1877. Sacc., Syll. Fungorum 4:75. 1886.

*Moniliaceae.* Heads purple brown to black; conidia globose or subglobose. On dead cane stalks and leaves. Puerto Rico, Java. On piles of bagasse and as an agent in sugar deterioration. Louisiana.

Aspergillus penicillioides Speg., Rev. Agron. y Vet. 2:246. 1896. Sacc., Syll. Fungorum 14:1045. 1899. Thom and Church, The Aspergilli, p. 126. 1926.

*Moniliaceae.* Heads dusky green, no perithecia noted. An intermediate form between *A. glaucus* and the *A. fumigatus* group (Thom and Church).

Conidia ellipsoid, 3-4 × 2.5 μ. On moldy cane, Argentina, and causing mold of sugar products, Louisiana.

Aspergillus repens (Cda.) deBy. and Wor., Beitr. z. Morph. u. Phys. der Pilze, p. 379. 1866. Sacc., Syll. Fungorum 4:64. 1886. Thom and Church, The Aspergilli, p. 113-114. 1926.

*Moniliaceae. A. glaucus* group. Conidia globose or oval, verruculose, 4-8.5 μ; perithecia yellow, minute; spores hyaline, without ridges or furrows, 4-7 × 3.7 μ. On sugar. Louisiana.

Aspergillus sacchari Speg., Anal. Mus. Nac. Buenos Aires 6 (ser. 2ª, vol. 3): 244. 1899. *Eurotium sacchari* Speg., Loc. cit.

*Moniliaceae.* Sulphur yellow perithecia, 150 μ in diam.; ascospores ellipsoid, hyaline, 4-6 × 2-4 μ. "Lacks essential characters necessary to separate it from other forms of *A. glaucus* with yellow perithecia." Thom and Church, The Aspergilli, p. 115. 1926. Argentina.

Aspergillus sydowi (Bainier and Sartory) Thom and Church, The Aspergilli, pp. 147-8. 1926. *Sterigmatocystis sydowi* Bainier and Sartory, Ann. Myc. 11:25-29, pl. III. 1913. Sacc., Syll. Fungorum 25:663. 1931. (Referred to *A. nidulans* (Eidam) Wint.).

*Moniliaceae. Aspergillus versicolor* group. Forming a velvety, blue-green mold on sugar. Louisiana, Union So. Africa.

Aspergillus terreus Thom, *in* Svensk Bot. Tids. 10:5. 1916. Thom and Church, Amer. Jour. Bot. 5:85-6. 1918. Thom and Church, The Aspergilli, pp. 150-2, 1 fig. 1926. Sacc., Syll. Fungorum 25:659. 1931.

*Moniliaceae.* Colonies cinnamon to deeper brown in age; conidiophores 50-150 μ long, 5-8 μ diam., flexuous; sterigmata in two series; conidia elliptical to globose, smooth, in long chains, 2.2-2.5 μ diam., perithecia not found. On baled bagasse. Louisiana.

Aspergillus varians Wehm., Bot. Centralbl. 80:460. 1898. Sacc., Syll. Fungorum 16:1028. 1902. Thom and Church, The Aspergilli, p. 127. 1926.

*Moniliaceae.* An Aspergillus "of doubtful relationships," on sugar solutions. Germany.

*Asterina concentrica* Cke. See *Asterula concentrica* (Cke.) Sacc.

*Asterostroma albido-carneum* Mass. See *Asterostroma cervicolor* (Berk. and Curt.) Mass.

Asterostroma cervicolor (Berk. and Curt.) Mass., Linn. Soc. Bot. Jour. 25:155. 1889. Sacc., Syll. Fungorum 9:237. 1891. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:215, pl. XXVI (figs. 4-7). 1917. Bourdot and Galzin, Bull. Soc. Myc. Fr. 36:44. 1920. *Asterostroma albido-carneum* Mass., Linn. Soc. Bot. Jour. 25:135, pl. 46 (figs. 8, 9). 1889.

*Thelephoraceae.* Thin, effused, spongy, dry fungus layer formed on dead leaf-sheaths at base of living stalks and on surrounding soil and trash. Characteristic stellate organs in hymenium; cystidia present; spores hyaline, spherical, echinulate, 4-5 μ in diam. Puerto Rico.

Asterula concentrica (Cke.) Sacc., Syll. Fungorum 9:377. 1891. *Asterina concentrica* Cke., Grevillea 14:13. 1885.

*Perisporiaceae.* Dark brown, orbicular, then confluent spots on culms; spores elliptical, continuous (?), hyaline, 8 × 3 μ. N. W. India. Theissen (Ann. Myc. 10:13. 1912) deletes the species saying, "eine unreife Dothideaceae." The genus *Asterula* is no longer recognized.

Bacillus ananas Serrano, Phil. Jour. Sci. 36:271-300, pls. 1-19. 1928. *Erwinia ananas* Serrano, L. c.

*Bacteriaceae.* This organism, reported as the cause of a brown rot of pineapple fruitlets, was found by inoculations to cause red streaks in cane stalks. Philippine Islands.

Bacillus flavidus Fawcett, Rev. Ind. y Agric. Tucuman 13:5-15. 1922. Review App. Myc. 2:338. 1923.

*Bacteriaceae.* Organism motile, flagellate, no spores, gram negative, associated with top rot or "polvillo." Affected canes show reddish stains on upper sheath, red streaks on leaves, terminal bud rots with production of an evil smelling liquid. Forms tentatively called *Bacillus* D and *Bacillus* F also associated. Argentina. See also *Bacillus sacchari* Speg. Fawcett's use of the name is untenable, it having been applied by Morse (Jour. Inf. Diseases 11: 284. 1912) to a pathogenic organism isolated from the nose and throat of animals. Bolle (Arch. Suikerindus. Ned.-Indië 1927, p. 593) believes that polvillo is pokkah boeng or top rot.

Bacillus glagae Janse, Meded., 's Lands Plant. 9:1-56, figs. 11-16. 1891.

*Bacteriaceae.* An organism said to have been associated with Seréh, but also reported as occurring on *Saccharum spontaneum* and other hosts, so doubtless a normal inhabitant of cane. Java.

Bacillus levaniformans Grieg-Smith, Proc. Linn. Soc. N. So. Wales 26:614, pl. 30. 1901.

*Bacteriaceae.* Organism aerobic, rod-shaped, 1.3-2 × 1-6 μ, gram positive, found in connection with studies on sugar deterioration. New South Wales.

Bacillus liodermos (Flügge) Chester, Man. Det. Bacter., p. 272. 1901.

*Bacteriaceae.* Concerned with raw sugar deterioration. Louisiana.

Bacillus megatherium DeBary, Vergl. Morph. u. Biol. der Pilze, Mycetozoa u. Bacteria, p. 499, fig. 194. 1884.

*Bacteriaceae.* A common soil organism found associated with normal and Seréh-diseased cane (Kühr), which when inoculated produced red discolorations, but not Seréh. Also associated with sugar deterioration. Louisiana.

Bacillus mesentericus (Flügge) Migula, Syst. der Bakterien 2:555-6. 1900.

*Bacteriaceae.* Associated with sugar deterioration, including var. *ruber, fuscus, niger,* and *vulgatus.* Louisiana. See also statement under *Bacillus megatherium.*

Bacillus polymyxa (Praz.) Gruber, Centbl. Bakt. II Abt. 14:353. 1905.

*Bacteriaceae.* Isolated from normal cane stalks by Wolzogen Kühr. Java.

Bacillus pseudarabinus Grieg-Smith, Proc. Linn. Soc. N. So. Wales 29:453. 1904.

*Bacteriaceae.* Organism a short, thick rod with rounded ends, flagellate, non-spore forming, found associated with internal red stripes in stalks. New South Wales. *Red string of sugar cane.*

Bacillus saccharalis Owen, Jour. Bact. 1:239, 3 figs. 1916.

*Bacteriaceae.* Organism a short thick rod, with rounded ends, gram positive, 2.8 × 1.0 μ, non-motile, non-flagellate, non-spore forming. Found in moth stalk-borer galleries and considered an agent in cane deterioration. Louisiana.

Bacillus (?) sacchari Janse, Mededeel. 's Lands Plant. 9:1-56, figs. 1-10. 1891. Rev. Bot. Centbl. 40:374. 1892. Smith, Bacteria in Relation to Plant Diseases 3:72-80. 1914.

*Bacteriaceae.* Organism an aerobic spore former, said to be a contributory cause of Seréh in Java, but since found in many other plants as well as cane, probably a normal inhabitant of these plants and not pathogenic. Went suggests the organism is *B. subtilis.* A *Bacillus sacchari,* not further identified, associated with sugar deterioration. Louisiana.

Bacillus sacchari Speg., La Gangrena Humeda ó Polvillo de la Caña de Azucar en Tucuman, p. 23. 1895. Spegazzini, Rev. Fac. Agron. y Vet. 2:238. 1896. Smith, Bacteria in Relation to Plant Diseases 3:85-88. 1914.

*Bacteriaceae.* Organism described as chromogenic (red), aerobic, solitary or in chains, 1.5-3 × 0.8 μ. Found associated with top rot (gangrena humeda). Argentina. Smith (l. c.) states that "it is an open question whether the disease is or is not Cobb's disease." Elliott refers the species to *Bacterium vasculorum* (Bacterial Plant Pathogenes, p. 253. 1930.) See *Bacillus flavidus* Fawcett, which may well be the same organism, since apparently the same disease is involved.

Bacillus sacchari Roldan, Phil. Agric. 20:247-258, 5 pls. 1931. *Erwinia sacchari* Roldan, l. c.

*Bacteriaceae.* Organism a cylindrical rod with rounded ends, occurring singly or in pairs, motile by 4 to several peritrichiate flagella, non-spore forming, gram negative, 0.9-2.2 × 0.5-0.7 μ. Causes a soft top rot with unpleasant odor. Philippine Islands. The name is untenable, having been used at least twice previously (q. v.) and the present organism should be renamed if it is to remain in the genus *Bacillus.* *Bacterial stem rot.*

Bacillus subtilis (Ehrbg.) Cohn, Beitr. z. Biol. d. Pflanzen 1:175. 1872.

*Bacteriaceae.* A common soil organism found in connection with pokkahboeng, and isolated from normal and Seréh-diseased cane. Saprophytic. Java.

*Bacillus vascularum* Cobb See *Bacterium vasculorum* (Cobb) Grieg-Smith

Bacillus vulgatus Trevisan, I Gen. e Spec. d. Batteriacee, p. 19. 1889. *Bacillus mesentericus vulgatus* Flügge, Die Mikroorganismen, p. 322. 1886.

*Bacteriaceae.* Concerned with raw sugar deterioration. Louisiana.

BACTERIUM spp.

Bacteria not specifically named have been reported found in cases of top rot. British Guiana, Louisiana.

BACTERIUM ALBILINEANS Ashby, Trop. Agric. 6:138. 1929. Wilbrink, Arch. Suikerindus. Ned.-Indië 28:1399-1525. 1920. North, Colon. Sugar Refining Co., Agric. Rept. 8, 80 pp., 2 col. pls., 1926; also No. 9, 48 pp., 2 col. pls., 1929. Martin, Carpenter and Weller, Hawaiian Pl. Rec. 36:145-196, 23 figs., 1 col. pl. 1932.

*Bacteriaceae.* Organism motile by single polar flagellum, slender, .2-.3 $\mu$ diam.; producing long white stripes of uniform width on leaf-blades with rose colored vascular bundles in nodes and buds. In acute cases plants wilt; in chronic form stools are dwarfed with side shoot development, leaves chlorotic. A vascular disease without gum production. Australia, Fiji, Formosa, Japan, Java, Hawaii, Madagascar, Mauritius, Philippine Islands, Reunion.

*Leaf Scald, Java gum disease, Gomziekte.*

BACTERIUM ANDROPOGONI E. F. Smith, Bact. Relation Pl. Dis. 2:63. 1911. Elliott and Smith, Jour. Agric. Res. 38:1-22. 1929.

*Bacteriaceae.* Produced red stripes on cane leaves where inoculated. United States.

BACTERIUM FLUORESCENS LIQUEFACIENS (Flügge) Lehm. and Neumann, Atl. Prin. Bact. 2:285. 1901.

*Bacteriaceae.* Found in reddened cane tissues, associated with *Bacillus pseudarabinus* Grieg-Smith. New South Wales. Isolated from Seréh-diseased cane, Java.

BACTERIUM HERBICOLA AUREUM Burri and Düggeli, Centbl. f. Bakt. 13:56-63, 198-200. 1904. Wolzogen Kühr, Arch. Suikerind. Ned.-Indië 31:321-484. 1923.

*Bacteriaceae.* Organism isolated from normal and Seréh-diseased plants. Java.

BACTERIUM HERBICOLA VASCULARUM Wolzogen Kühr ex van Hall, Med. v. het Lab. voor Plantenz. 36:45. 1919.

*Bacteriaceae.* Reported to van Hall (l. c.) by director of Proefsta. Java Suikerindus. as associated with Seréh and as the cause of Java gum disease (leaf scald). Statements based on work of Wolzogen Kühr, although subsequent paper by latter uses only the preceding trinomial. Apparently a temporary name.

BACTERIUM PRODIGIOSUM (Ehrenberg) Lehm. and Neum., Determinative Bact. 2:458. 1931.

*Bacteriaceae.* Isolated from Seréh-diseased cane (Wolzogen Kühr), saprophytic. Java.

BACTERIUM PYOCYANEUM SACCHARUM Desai, Indian Jour. Agric. Sci. 5:387-391. 1935.

*Bacteriaceae.* Organism gram negative, non-spore forming, 1-flagellate (polar), not acid fast; colonies bluish. Affected canes wilt with production

of peculiar fermenting odor; tissues ferment and disintegrate from bud to root, entire cane becoming a mass of soft evil-smelling pulp. India.

*Stinking rot.*

Bacterium rubrilineans (Lee, Purdy, Barnum, and Martin) Elliott, Manual Bact. Plant Pathogens, p. 195. 1930. *Phytomonas rubrilineans* Lee, Purdy, Barnum, Martin, Red-Stripe Disease Studies Exp. Sta. Hawaiian Sugar Pl. Assoc., p. 72. 1925. Bolle, Arch. Suikerindus. Ned.-Indië 1929:1147-1218, 5 pl. (1 col.). 1929. Cottrell-Dormer, Queensland Bur. Sugar Exp. Sta. Path. Bull. 3, 35 pp., 1 col. pl. 1932.

*Bacteriaceae.* Organism a short cylindrical rod, 1-3 polar flagellate, motile, gram negative, 1.6 × .7 μ; producing long narrow, bright red streaks 15-40 cm long × .5-2 mm wide, on leaves and leaf-sheaths, and top rot when severe. *Red-stripe "Polvillo" (?)*

Argentina, Brazil, Cuba, Dutch East Indies, Formosa, Hawaii, India, Indo-China, Kenya, Philippine Islands, Puerto Rico, Queensland, United States, Uganda.

[Phytomonas] rubrisubalbicans Christopher and Edgerton, Jour. Agric. Res. 4:259-267, 2 figs. 1930. Cottrell-Dormer, Queensland Bur. Sugar Exp. Sta. Path. Bull. 3:56-57, 1 col. pl. 1932.

*Bacteriaceae.* Organism a short rod, motile, with polar flagella, gram negative, non-spore forming, causing red stripes with white background, which may coalesce to give a mottled effect. Stripes up to a meter in length, few to many.

*Mottled-stripe.*

Louisiana, Puerto Rico, Queensland. The binomial is cited as published to avoid making a new combination.

Bacterium sacchari Grieg-Smith, Proc. Linn. Soc. New So. Wales 27:142-3, 1 pl. 1902.

*Bacteriaceae.* Organism a short rod with rounded ends, occurring singly or in pairs, motile, 1-9 flagellate, 1-2 × .6 μ. Apparently an inhabitant of normal as well as diseased cane found when studying *Bacterium vasculorum* (Cobb) Grieg-Smith. The *Bacterium sacchari* Janse mentioned by Wakker and Went (l. c., p. 90) evidently refers to *Bacillus sacchari* Janse.

Bacterium vasculorum (Cobb) Grieg-Smith, Proc. Linn. Soc. New So. Wales 27:31-47, 2 pls. 1902. Ashby, Trop. Agric. 6:135-8. 1929. North, Colon. Sugar Ref. Co. Agric. Rept. 10, 150 pp., 7 figs., 2 col. pls. 1935. *Bacillus vascularum* Cobb, Agric. Gaz. New So. Wales 4:777-98, 14 figs. 1893. *Pseudomonas vascularum* (Cobb) E. F. Smith, U. S. Dept. Agric. Div. Veg. Phys. and Path. Bull. 28:153. 1901. *Phytomonas vascularum* (Cobb) Bergey et al, Man. Deter. Bact. ed 3, p. 247. 1930.

*Bacteriaceae.* Organism yellow, a short rod, motile, 1-flagellate, non-spore forming, .6-1.5 × .3-.5 μ; producing a vascular disease marked by dwarfing, etiolation, red stripes on leaves, decay of terminal buds, and with yellow slime or gum produced in the bundles.

*Gumming disease, Cobb's disease, Gummosis.*

Antigua, Barbados, Brazil, Colombia, Dominica, Fiji, Guadeloupe, Madeira, Mauritius, Mexico (?), New Guinea, New South Wales, Puerto Rico, Queens-

land, Reunion, St. Kitts, St. Lucia. Ashby (Trop. Agric. 6:135-8, 1929) indicates existence of two strains of this organism. Kirchner (Zeit. Pflanzenkr. 34:260, 1924) points out that the species name should be spelled "vasculorum."

Puncture inoculations of *Holcus sorghum* gave gumming leaf symptoms, and on sweet corn produced symptoms similar to those induced on this host by *Aplanobacter stewarti* (E. F. Smith) McCulloch (Ivanoff, Phytopath. 25:21, 1935). Gumming was transmitted to certain varieties of corn under natural conditions. Queensland (Ann. Rept. Bur. Sugar Exp. Sta's in 1935, p. 26, 1936).

Bacterium vulgare (Hans.) Lehm. and Neum., Determinative Bact. 2:485. 1931.

*Bacteriaceae.* Isolated from Seréh-diseased cane (Wolzogen Kühr). Java.

Bakerophoma sacchari Died., Ann. Myc. 14:63. 1916. Sacc., Syll. Fungorum 25:182. 1931.

*Phomaceae.* Produces small reddish spots at base of leaf blade and upper portions of sheath, 1-4 mm in length, with white centers and red borders. Conidia ellipsoid, 4-5 × 2.5 μ. China, Philippine Islands. The genus is reduced to synonymy with *Phoma* by Clements and Shear.

*Baker's leaf spot.*

*Basisporium gallarum* Moll. See *Nigrospora oryzae* (B. and Br.) Petch

Botryodiplodia saccharina Died., Ann. Myc. 14:203. 1916. Sacc., Syll. Fungorum 25:313. 1931.

*Phomaceae.* Conidia 2-celled, brown, ellipsoid, not constricted at the septa, 24-28 × 10-15 μ. On dead culms. India. Probably not distinct from *Diplodia cacaoicola* P. Henn. See *Physalospora rhodina* (Berk. and Curt.) Cke.

*Dry rot.*

*Botryodiplodia theobromae* Pat. See *Physalospora rhodina* (Berk. and Curt.) Cke.

Botrytis sp.

*Moniliaceae.* Gray mold on dead leaves. Puerto Rico.

[Brown rot] Wood, Queensland Agric. Jour. 29:197. 1928.

*Undetermined.* Dark brown felt-like fungus layers formed between outer leaf sheaths, which are cemented together and rotted. Stalks internally dry, pithy and soon dying. Queensland.

Calonectria gigaspora Mass., Kew. Bull. Misc. Inform. 1906-257. 1906. Sacc., Syll. Fungorum 22:490. 1913.

*Hypocreaceae.* A saprophyte found in moth stalk-borer galleries; spores hyaline, subfusoid, triseptate, 90-100 × 20 μ. Trinidad.

Capnodium spp.

*Capnodiaceae.* Form black sooty fungus layers on leaves and stalks following mealybugs, leafhoppers, and other insects. None have been named specifically, only imperfect fruiting stages being present, *Triposporium, Fumago, Coniothecium, Cladosporium,* etc. The finding of perfect stages will permit specific assignments in *Capnodium* or its many segregates. All saprophytic, a

Brazilian report to the contrary, doubtless in error. Sooty molds have been referred at times, but erroneously, to *Meliola*.

*Sooty mold, black smut, fumagine, etc.*

Argentina, Brazil, British Guiana, Hawaii, India, Java, Mauritius, New South Wales, Philippine Islands, Puerto Rico, Queensland, South China.

CATENULARIA ECHINATA Wakker *in* Wakker and Went, Ziekt. v. h. Suikerriet op Java, p. 196. 1898. Sacc., Syll. Fungorum 14:1076. 1899.

*Dematiaceae*. Conidia dark, globose, in chains, 14 $\mu$ diam. On dead stalks. Java. "This may be a form of *Sphaeronema adiposum*" Caum.

CEPHALOSPORIUM spp.

*Moniliaceae*. Unnamed forms associated with root disease (Louisiana), top rot (Uganda) and a "new disease" (Barbados). The latter probably *C. sacchari* (q. v.).

CEPHALOSPORIUM SACCHARI Butler, Mem. Dept. Agric. India (Bot. Ser.) 6:185, pl. 2. 1913. Sacc., Syll. Fungorum 25:651. 1931.

*Moniliaceae*. Mycelium effuse, grayish white; hyphae sparingly septate, 3-5 $\mu$ diam.; conidia borne on short, simple or branched conidiophores, hyaline, oval to ovoid or long elliptical, continuous, 4-12 $\times$ 2-3 $\mu$. This fungus causes a wilt disease marked by internal purple or dirty-red coloration and drying up of infected canes. Argentina, Barbados, British West Indies, Colombia, Guadeloupe, India, Mexico, Philippine Islands, Trinidad, Union South Africa, Uganda. *Wilt.*

CERATOSTOMELLA ADIPOSUM (Butler) Sartoris, Jour. Agric. Res. 35:577-585, 4 figs. 1927. *Stat. conid.=Sphaeronema adiposum* Butler, Mem. Dept. Agric. India (Bot. Ser.) 1:40, figs. 47-61. 1906. Sacc., Syll. Fungorum 22:926-7. 1899.

*Sphaeriaceae*. Mycelium dark brown; fertile hyphae bear endoconidia, varying from cylindrical to pyriform or globose, hyaline to brown, smooth to verrucose, 9-25 $\times$ 4.5-18 $\mu$; pycnidia globose, black, long beaked; conidia hyaline, 6.5 $\times$ 3.5 $\mu$; perithecia long beaked; spores crescent shaped, 6.5-8 $\times$ 3.5-4 $\mu$. Causes a dark purple to black, soft, watery rot of seed cane with odor similar to that produced by *Ceratostomella paradoxa*. Davidson (Jour. Agric. Res. 50: 802, fig. 3, 1935) accepts the genus *Endoconidiophora* Münch (differentiated from *Ceratostomella* by endogenous conidia of the imperfect stage) and proposes the new combination *E. adiposa* (Butler) Davidson. Butler (Fungi and Disease in Plants, p. 383, 1918) suggested that possibly *Catenularia echinata* should be referred to this species. Brazil, Dominican Republic, India, Peru, United States. *Black rot.*

CERATOSTOMELLA PARADOXA (de Seynes) Dade, Trans. Brit. Myc. Soc. 13:184-194, 3 pls. 1928. *Sporochisma paradoxum* de Seynes, Recherches Veg. Infer. III, p. 30, figs. 22-24. 1886. *Chalara paradoxa* (de Seynes) Sacc., Syll. Fungorum 10:595. 1892. *Thielaviopsis ethaceticus* Went, Archief. v. d. Java Suikerind. 1:124, pl. 3. 1893. Wakker and Went, Ziekten v. h. Suikerriet op Java, pp. 44-49, pl. IV (col.). 1898. Petch, Ann. Roy. Bot. Garden Peradeniya 4:511. 1910. *Stat. conid.=Thielaviopsis paradoxa* (de Seynes) v. Hoeh., Hedw. 43:295. 1904. Butler, Mem. Dept. Agric. India (Bot. Ser.)

1:32-34, figs. 37-46. 1906. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:235. 1917. Miyake, Sugar Expt. Sta. Formosa Bull. 10, 2 col. pls. 1919.

*Sphaeriaceae.* Endoconidia hyaline, catenulate, 10-15 × 3.5-5 μ; macroconidia ovate, fuscous, catenulate, 14-19 × 10-12 μ; perithecia black, immersed, 200-350 μ diam.; beaks long, black, shining, with fimbriate tips, 800-1200 μ; spores ellipsoid, 7-10 × 2.5-4 μ. Causes an internal black rot of seed pieces, with a characteristic "pineapple odor." Sundararaman (Rept. Dept. Agric. Madras 1927-28:355-92, 1928) successfully infected sugar cane with this fungus from the bleeding disease of Palmyra palms. Massee erroneously reported *Thielaviopsis* as a form of his *Trichosphaeria sacchari*. Davidson (l. c.), following Münch, proposes the new combination *Endoconidiophora paradoxa* (de Seynes) Davidson for this fungus.

*Pineapple disease.*

Antigua, Argentina, Barbados, Brazil, British Guiana, Ceylon, Colombia, Cuba, Dominican Republic, Fiji, Formosa, Guadeloupe, Hawaii, India, Jamaica, Japan, Java, Madeira, Mauritius, Mexico, Philippine Islands, Puerto Rico, Queensland, Reunion, St. Kitts, St. Lucia, St. Vincent, Southern United States (Florida, Louisiana, Mississippi), Surinam, Tahiti, Trinidad. Also on *Saccharum spontaneum*. India.

Cercospora acerosum Dickh. and Hein, Archief. v. d. Java Suikerind. 9:1013, 2 pls. 1901. Sacc., Syll. Fungorum 18:611. 1906. (As *C. acerosa*).

*Dematiaceae.* Conidia 1-6 septate, 10-50 × 2-3.5 μ, on dark brown irregular spots at juncture of leaf blade and sheath. Java, Philippine Islands.

*Black spot.*

Cercospora kopkei Krüger, Ber. Zuck. in West-Java 1:115, pls. VI (col.), VIII B (figs. 1-5). 1890. Sacc., Syll. Fungorum 10:656. 1892. Wakker and Went, Ziekten Suikerriet op Java, pp. 141-144, pls. XVII, XVIII (figs. 9-11). 1898. Bolle, Arch. Suikerindus. Ned.-Indië, 1931, III:1189-1206. 1931.

*Dematiaceae.* Purple brown, amphigenous spots on leaf blades, irregular in shape, often confluent; conidia subhyaline, fusoid, 3-4 septate, 20-50 × 5-8 μ. Also occurs on *Saccharum spontaneum*. *Yellow spot.*

Argentina, Barbados, Brazil, British Guiana, Burma, China, Colombia, Cuba, Formosa, India, Indo-China, Java, New Guinea, Philippine Islands, Queensland, Reunion, Trinidad, and Tobago.

Cercospora longipes Butler, Mem. Dept. Agric. India (Bot. Ser.) 1:41-44, figs. 13-21. 1906. Sacc., Syll. Fungorum 22:1432. 1913. Butler, Fungi and Disease in Plants, pp. 405-6, fig. 168. 1918.

*Dematiaceae.* Conidiophores 100-200 × 4 μ; conidia obclavate, straight or curved, hyaline, 4-6-septate, 40-80 × 5 μ. Spots on leaf blades, narrow, oval, amphigenous, at first 4 mm wide, reddish-brown with brown center and yellow areole; finally centers ashen with deep brown ring, 15 × 4 μ.

*Brown spot.*

Argentina, Brazil, British West Indies, Colombia, Cuba, India, Java, Madagascar, Mauritius, Peru, Philippine Islands, Puerto Rico, Reunion, Southern United States (Florida, Louisiana), Tanganyika, Trinidad, Uganda.

*Cercospora sacchari* v. Breda de Haan See *Helminthosporium sacchari* (v. Breda de Haan) Butler *Eye spot.*

CERCOSPORA SORGHI Ell. and Everh. Jour. Myc. 3:15. 1887. Sacc., Syll. Fungorum 10:656. 1892.

*Dematiaceae.* This species originally described on *Holcus* and *Zea,* produced slight infections on sugarcane leaves following wound inoculations. India.

CERCOSPORA TAIWANENSIS Matsumoto and Yamamoto, Jour. Soc. Trop. Agric. (Formosa) 6:590-591, fig. 1. 1934. Kiryu Rept. Gov't Sugar Expt. Sta. Taiwan (Formosa) 3:19-28, pls. 4-5. 1936.

*Dematiaceae.* Conidiophores nonfasciculate, subhyaline to olivaceous brown, 1-6 septate, 7-55 × 2.5-4 μ; conidia obclavate-filiform, straight or slightly curved, hyaline, 2-15 septate, 29-153 × 2.5-3.7 μ. Spots amphigenous, elliptical or elongated, 2-10 × 1-1.5 mm, yellowish, dotted with red, coalescing into long streaks or bands and becoming darker in color; infected leaves drying up and dying. Formosa (Taiwan).

CERCOSPORA VAGINAE Krüger, Ber. Versuchssta. f. Zuckerohr West-Java 2:248-9, pl. I (figs. 1-3). 1896. Wakker and Went, Ziekten Suikerreit op Java, pp. 105-120, pls. XIII, XIV (col. fig. 1). 1898. Sacc., Syll. Fungorum 14:1106. 1899. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:199-200, pl. 29 (figs. 19, 20), pl. 24 (fig. 1). 1917.

*Dematiaceae.* Conidia 1-several septate, 15-40 × 4-8 μ. Causing bright red spots on leaf sheaths, circular at first, then large and irregular, involving most of sheath, penetrating deeply, finally with black fruiting patches at center. *Red spot of leaf sheath.*

Argentina, Barbados, Brazil, British Guiana, China, Colombia, Cuba, Dominican Republic, Formosa, Haiti, Hawaii(?), Honduras, India, Indo-China, Jamaica, Japan, Java, Lesser Antilles, Mauritius, Mexico, Philippine Islands, Puerto Rico, Queensland, Reunion, Siam, Southern United States, Trinidad, Union South Africa. On *Saccharum spontaneum,* Formosa.

CHAETOMELLA SACCHARI Delacroix, Bull. Soc. Myc. France 13:123, pl. X (fig. c). 1897. Sacc., Syll. Fungorum 14:925. 1899.

*Phomaceae.* Pycnidia flattened, subspherical, setose; conidia broadly fusoid, 10-18 × 9 μ. On dead stalks. Madeira, Peru, Reunion.

CHAETOMIUM GLOBOSUM Kunze, Myc. Hefte 1:15-16, fig. 9 a-d. 1817. Sacc., Syll. Fungorum 1:222. 1882.

*Sphaeriaceae.* Perithecia 225-250 μ diam.; lateral and terminal hairs numerous, interwoven, dark olive; spores dark olive brown, ovate to lemon-shaped, apiculate, 10.5 × 8.5 μ. On cane trash. Barbados.

CHAETOMIUM VIRIDE Lév., Ann. Sci. Nat. (3) 3:65. 1845. Sacc., Syll. Fungorum 1:229. 1882.

*Sphaeriaceae.* Saprophyte on cane trash. Argentina. Not sufficiently well described to recognize further.

CHAETOPHOMA (?) MAYDIS Speg., Anal. Soc. Cien. Argentina 22:190. 1886. Sacc., Syll. Fungorum 10:218. 1892.

*Phomaceae.* Pycnidia globose, 50-90 μ diam.; conidia elliptical, hyaline, 2.5-3.5 × 1.5-2 μ. On dead and rotting leaves. Brazil.

CHAETOSTROMA SACCHARI Mass., Grevillea 22:67. 1893. Sacc., Syll. Fungorum 11:655. 1895.

*Tuberculariaceae.* Circular to elongated, black, velvety patches up to 2 mm in diam.; sporodochia setose; setae straight, dark brown, 80-150 × 7-12 μ; conidia globose, dark brown, 10-12 μ. On dying leaves. Barbados.

*Chaetostroma sacchari* Speg. See *Chaetostroma saccharicolum* Sacc. and Syd.

CHAETOSTROMA SACCHARICOLUM Sacc. and Syd. *in* Sacc., Syll. Fungorum 14:1130. 1899. *Chaetostroma* (?) *sacchari* Speg., Rev. Fac. Agron. y Vet. 2:255. 1896.

*Tuberculariaceae.* Sporodochia black, sparse or solitary; setae straight, black, 50-70 × 3-5 μ; conidia catenulate, fusiform, olivaceous, 7-12 × 3-5 μ. On rotten cane trash. Argentina.

*Chalara paradoxa* (de Seynes) Sacc. See *Ceratostomella paradoxa* (de Seynes) Dade

CHONDROMYCES SACCHARI Speg., Rev. Fac. Agron. y Vet. 2:252. 1896. Sacc., Syll. Fungorum 14:842-3. 1899.

*Myxobacteriaceae.* Conidia obtusely rounded, 1-celled, hyaline, 16-25 × 8-18 μ. On rotting cane trash. Argentina.

CHROMOCREA GELATINOSA (Tode) Seaver, Mycologia 2:58, pl. 20 (figs. 11-13). 1910. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:212. 1917. *Hypocrea gelatinosa* (Tode) Fr., Summa Veg. Scand., p. 383. 1849. Sacc., Syll. Fungorum 2:524. 1883.

*Hypocreaceae.* Stromata fleshy, bright lemon-yellow, finally punctate with greenish dots, 1-4 mm in diam.; asci 16-spored; spores green, finally brown, 5 μ in diam. On dead and dying leaf sheaths. Puerto Rico.

CHROMOCREOPSIS STRIISPORA Stevenson, Jour. Dept. Agric. P. Rico 1:213. 1917. Sacc., Syll. Fungorum 24:1339. 1928.

*Hypocreaceae.* Stromata few, scattered subglobose or flattened to substipitate, 1-3 mm diam.; spores ovoid to elliptical, striate, 20-22 × 5-7 μ. On dead stalks. Puerto Rico.

CHYTRIDIUM sp.

An unnamed species parasitic in roots of cane affected with root-rot or Lahaina disease. (Hawaiian Planters' Rec. 21:2-8. 1919.)

CINTRACTIA PULVERULENTA Cke. and Mass., Grev. 18:34. 1889. Sacc., Syll. Fungorum 9:285. 1891.

*Ustilaginaceae.* Black fungus masses replacing ovaries; sporeballs subrotund or ovoid, 40-50 μ diam.; spores about 40 per ball, globose, verruculose, fuscous, 8-10 μ. On *Saccharum arundinaceum.* India.

CIRCINELLA SYDOWII Lendner, Bull. Soc. Bot. Genève (ser. 2) 5:29, illus. 1913. Sacc., Syll. Fungorum 24:6. 1926.

*Mucoraceae.* Spores spherical, gray, 6-7 μ diam. In sugar solutions. Union So. Africa.

*Citromyces* spp. See *Penicillium* spp.

*Citromyces pfefferianus* Wehmer See *Penicillium pfefferianus* (Wehmer) Pollacci

Cladoderris dendritica (Pers.) Berk., London Jour. Bot. 1:152. 1842. Sacc., Syll. Fungorum 6:549. 1888. *Thelephora dendritica* Pers. *in* Freycinet Voy. Autor du Monde (Bot.), p. 176, pl. 1 (fig. 4). 1826.

*Thelephoraceae.* Sporophores erect, laterally stipitate, 10-15 cm in height; upper surface spongy, reddish-brown; hymenial surface with narrow, sharp radiating ribs. On dead stalks. Puerto Rico.

Cladosporium sp.

*Dematiaceae.* On dead cane. India. Sooty mold on stalks. Java. An agent of sugar deterioration. Louisiana.

Cladosporium graminum Lk. *in* Linn., Spec. Plantarum (Ed. 4) 1:42. 1824. Corda, Icones Fungorum I, p. 14, pl. III (fig. 207). 1837. Sacc., Syll. Fungorum 4:365. 1886. Averna Sacca, Bol. Agric. Sao Paulo 17:641, 1 fig. 1916.

*Dematiaceae.* Circular to irregular spots on canes, with definite borders, 1-2 cm diam.; conidia fuliginous, 1-2 septate, 16-27 × 10 μ. On canes. Brazil.

Cladosporium herbarum (Pers.) Lk. Mag. Ges. Naturf. Freunde 7:37. 1886. Sacc., Syll. Fungorum 4:350. 1886.

*Dematiaceae.* Green to gray-green mold; conidia 1-4 septate, brown to olive green, oblong to ovoid. On cut cane leaves and cane trash. Argentina, Hawaii, Puerto Rico.

Cladosporium (Dematium) javanicum Wakker, Archief. v. d. Java-Suikerind. 4:889-92, pl. XVIII. 1896. Wakker and Went, Ziekten Suikerriet op Java, p. 197, pl. XXIII. 1898. Sacc., Syll. Fungorum 14:1082. 1899.

*Dematiaceae.* Gray-green mold; conidia hyaline, oblong, 2.5-3 × 1.5-2 μ. On dead roots and leaves. Java. Delacroix (Maladies d. Plantes Cult. d. les Pays Chauds, p. 552, pl. LXVI (fig. 7). 1911) uses Wakker's alternate name *Dematium javanicum* Wakker.

Clathrus columnatus Bosc, Mag. Gesell. Naturf. Freunde 5:85. 1811. Sacc., Syll. Fungorum 7:18. 1888. *Laternea columnata* (Bosc) Nees *in* Nees and Henry, System der Pilze Abt. 2, p. 96, pl. 23. 1858. *Clathrus trilobatus* Cobb, Hawaiian Sugar Planters' Association., Div. Path. and Phys. Bull. 5:209. 1906.

*Phallaceae.* Sporophores consisting of 2-5 spongy columns, joined at tips, pink to red within, paler without; dark slimy gleba borne on under side of joined tips; spores smooth, elliptical, 4-5 × 2-3 μ. Saprophytic on cane trash. Cobb considered his species one of the causes of root rot. Hawaii, Southern United States (Florida, Louisiana).

*Clathrus trilobatus* Cobb See *Clathrus columnatus* Bosc

*Clavaria gracillima* Wakker See *Clavaria wakkeri* Sacc. and Syd.

Clavaria wakkeri Sacc. and Syd. *in* Sacc., Syl. Fungorum 14:237. 1899. *Clavaria gracillima* Wakker *in* Wakker and Went, Ziekten suikerriet op Java, p. 195. 1898.

*Clavariaceae.* Sporophores erect, filiform, solitary or 2-5 fascicled, brittle; spores ovoid, hyaline, 8× 5 μ. On dead leaves. Java.

CLAVICEPS sp.

*Hypocreaceae.* Sclerotia replacing ovaries, curved, rugulose, purple-black, white within. In arrows of seedling canes. Philippine Islands. Not specifically named, but probably *C. purpurea* (Fr.) Tul., Ann. Sci. Nat. III, 20-43, pl. 3. 1853. Ocfemia, Phil. Agric. 19:585. 1931.

COCHLIOBOLUS STENOSPILUS (Carp.) Matsumoto and Yamamoto, Jour. Plant Bot. 23:9-14, 107-115, 7 figs. 1936 (Japanese). *Ophiobolus stenospilus* Carpenter *in* Cook, Cong. Internatl. Soc. Sugarcane Technol. (4) Bull. 128:7. 1933.

*Sphaeriaceae.* (Nomen nudum) an ascigerous stage developing in cultures of *Helminthosporium stenospilum* and agreeing with that assigned by Carpenter to *Ophiobolus*. Formosa, Japan.

*Coleroa sacchari* v. Breda de Haan See *Eriosphaeria sacchari* (v. Breda de Haan) Went

COLLETOTRICHUM FALCATUM Went, Arch. Java Suikerindus. 1:271, pls. V, VI. 1893. Sacc., Syll. Fungorum 11:570. 1895. Wakker and Went, Ziekten Suiekrriet. op Java, pp. 36-44, 193, pl. 3 (col.). 1898. Butler and Khan, Mem. Dept. Agric. India (Bot. Ser.) 6:151-178, 1 pl. 1913. Edgerton, La. Agric. Exp. Sta. Bull's 120, 28 pp., illus., 1910, and 133, 22 pp., illus., 1911. Miyake et al, Sugar Exp. Sta. Formosa Bull. 4, 6 col. pls. Abbott, U. S. Dept. Agric. Tech. Bull. (In press). 1938.

*Melaconiaceae.* Sporodochia black velvety; setae numerous, 100-200 × 4 μ; conidia 1-celled, 16-48 × 4-8 μ. Parasitic on leaf midribs and in stalks of species of *Saccharum,* and on leaf midribs of *Sorghum vulgare, S. halepense,* and *Erianthus giganteus.* In some regions causes wilt and death of infected sugar canes; interior characterized by reddened areas with white centers. Disease noted for sudden outbreaks (Java, West Indies, Louisiana). Abbott (l. c.) described morphologic races, identified in oatmeal-agar culture by compact, dark, velvety turf (dark races) and cottony, floccose mycelium (light races); also physiologic specialization within races. *Red rot.*

Antigua, Argentina, Barbados, Brazil, British Guiana, Central America, China, Colombia, Cuba, Dominican Republic, Egypt, Fiji, Formosa, Guadeloupe, Haiti, Hawaii, India, Indo-China, Jamaica, Japan, Java, Madagascar, Madeira, Mauritius, Mexico, Peru, Philippine Islands, Puerto Rico, Queensland, Reunion, St. Kitts, St. Lucia, Southern United States, Trinidad, Uganda, Union South Africa, Virgin Islands. Massee erroneously considers this species a form of his *Trichosphaeria sacchari.*

COLLETOTRICHUM GRAMINICOLUM (Cesati) Wilson, Phytopath. 4:106-112. 1914. Sacc., Syll. Fungorum 25:570. 1931. Böning and Wällner, Phytopath. Zeits. 9:99-110. 1936. Abbott, U. S. Dept. Agric. Tech. Bull. (In press). 1938. *C. lineola* Corda, from *Sorghum halepense* in Louisiana and *C. cereale* Manns from Ohio failed to produce red rot in sugarcane (Edgerton, La. Agr. Exp. Sta. Bull. 133, pp. 7-8, 1911).

*Melanconiaceae.* Setae 115 μ long; conidia 23.6-40.8 × 4.3-6.5 μ (Böning and Wällner), 15-23 × 4 μ (Abbott), 18-26 × 3-4 μ (Selby and Manns for *C. cereale*), variously described as straight, spindle or sickle-shaped. Cultures from Iowa and Baarn failed to infect sugarcane in spite of certain morpholog-

ical similarities with *C. falcatum*. Evidently considerable diversity of characters among the various fungi classified under this species (Abbott, l. c.).

*Anthracnose.*

COLEODICTYOSPORA CUBENSIS Charles, Phytopath. 19:1051-2, fig. 1. 1929.

*Dematiaceae.* Hyphae scanty, septate, hyaline to light fuscous; conidiophores fasciculate, septate, 70-85 × 3.5-5 μ; conidia transversely oblong, muriform, constricted at center, tawny-olive, 42-50 × 20-22 μ, with hyaline envelope. On dead cane. Cuba.

CONIOSPORIUM ARUNDINIS (Cda.) Sacc., Michelia 2:124. 1882. Sacc., Syll. Fungorum 4:243. 1886. *Gymnosporium arundinis* Cda., Icones Fung. 2:1, pl. 8 (fig. 1). 1838. *Papularia arundinis* (Cda.) Fr., Summa Veg. Scand., p. 509. 1849.

*Dematiaceae.* Acervuli black; conidia black, spherical, 1-guttulate, 8-12 μ diam. On dead culms. Alabama, Philippine Islands. Mason has [Annotated Account Fungi Received at Imp. Myc. Inst. List II (fasc. 2), p. 16] transferred this form to *Papularia sphaerosperma* (Pers.) v. Hoeh, Frag. z. Mykol., 20:990. 1916.

*Coniosporium extremorum* Syd. See *Nigrospora sphaerica* (Sacc.) Mason

CONIOSPORIUM SACCHARI Speg., Rev. Fac. Agron. y Vet. 2:248. 1896. Sacc., Syll. Fungorum 14:1069. 1899.

*Dematiaceae.* Acervuli minute, hemispherical, black; conidia opaque, globose, 8-9 μ diam. On rotten leaves and stalks. Argentina.

*Coniosporium vinosum* (Berk. and Curt.) Sacc. See *Papularia vinosa* (Berk. and Curt.) Mason

CONIOTHYRIUM sp.

*Phomaceae.* An undetermined form following "cold chlorosis." Cuba. On dead cane. Haiti, Trinidad.

*Coniothyrium melasporum* (Berk.) Sacc. See *Microdiplodia melaspora* (Berk.) Griff. and Maubl.

CONIOTHYRIUM OLIVACEUM Bon. *in* Fckl., Sym. 377. 1869. Sacc., Syll. Fungorum 3:305. 1884.

*Phomaceae.* Pycnidia scattered, erumpent, on irregular dead areas on leaves, 300-350 μ diam.; conidia elliptical-oblong, brown-olivaceous, 5-8 × 2-5 μ. On living leaves. Cuba.

*Coniothyrium sacchari* (Mass.) Prill. and Delacr. See *Melanconium sacchari* Mass.

CORETHROPSIS ELEGANS Speg., Rev. Fac. Agron. y Vet. 2:245. 1896. Sacc., Syll. Fungorum 14:1044. 1899.

*Moniliaceae.* Conidia acrogenous, solitary, globose, ovoid or ellipsoidal, hyaline, 10 × 8-9 μ. On dead and dying leaves. Argentina.

*Coriolopsis occidentalis* (Kl.) Murr. See *Polyporus occidentalis* Kl.

CORTICIUM spp.

*Thelephoraceae.* Several undetermined forms on rotten cane trash.. Puerto Rico, Queensland (spreading from tree stumps on new land).

Corticium arachnoideum Berk., Ann. and Mag. Nat. Hist. 13:345, pl. 9 (fig. 3). 1844. Sacc., Syll. Fungorum 6:611. 1888. Burt, Ann. Mo. Bot. Garden 13:184. 1926.

*Thelephoraceae.* Thin, arachnoid, 2-6 cm long; hymenial layer snow-white; spores hyaline, globose or subglobose, 4-6 $\mu$ diam. On cane trash. Puerto Rico.

Corticium centrifugum (Lév.) Bres., Ann. Myc. 1:96. 1903. V. Hoehnel, Ann. Myc. 3:188. 1905. Burt, Ann. Mo. Bot. Garden 13:206-8. 1926. *Hypochnus centrifugus* (Lév.) Tul., Fung. Carp. 1:113. 1861. Sacc., Syll. Fungorum 6:654. 1888.

*Thelephoraceae.* Fructifications thin, effused, arachnoid, fragile, white, rarely with clamp connections, no gloeocystidia; spores hyaline, smooth, ellipsoidal, 4-8 $\times$ 2.5-4 $\mu$. As *Hypochnus,* Japanese workers use this binomial for the perfect stage of *Sclerotium rolfsii* (q. v.).

*Corticium rolfsii* Curzi See *Sclerotium rolfsii* Sacc.

Corticium salmonicolor Berk. and Br., Linn. Soc. Bot. Jour. 14:71. 1873. Sacc., Syll. Fungorum 6:620. 1888. Burt, Ann. Mo. Bot. Garden 13:227-8. 1926.

*Thelephoraceae.* On P O J 2878. Java.

*Corticium sasakii* Shirai. See *Hypochnus sasakii* Shirai.

Corticium vagum Berk. and Curt., Grevillea 1:179. 1873. Sacc., Syll. Fungorum 6:616. 1888. Burt, Ann. Mo. Bot. Garden 13:295-7, 1 fig. 1926. *Rhizoctonia solani* Kuehn, Krankheit. v. Kulturgewachse, p. 224. 1858. Duggar, Ann. Mo. Bot. Garden 2:424. 1915.

*Thelephoraceae.* Sclerotia flattened, black, irregular, on underground part or at surface of soil; hymenium thin, arachnoid, sheathing stems, olive buff to cream; spores hyaline, smooth, flattened on one side, 8-14 $\times$ 4-6 $\mu$. Parasitic on cane roots and fruiting at base of living canes or on trash. Barbados, British Guiana, India, Louisiana, Mauritius, Philippine Islands, Puerto Rico.

Craterium aureum (Schum.) Rost., Monog., p. 124. 1875. Macbride and Martin, The Myxomycetes, p. 94, pl. VI (figs. 131-2). 1934.

*Physaraceae.* Sporangia stipitate, golden yellow; spores minutely warted, violaceous brown, 8-10 $\mu$ diam. On cane trash. Dominican Republic, Puerto Rico.

Craterium leucocephalum (Pers.) Ditm. *in* Sturm, Deutschl. Fl. Pilze, p. 121. 1813. Macbride and Martin, The Myxomycetes, p. 95, pl. VII (figs. 133-5). 1934.

*Physaraceae.* Sporangia short cylindrical, stipitate, white above, brown or reddish-brown below; spores minutely spinulose, violaceous brown, 8-9 $\mu$ diam. On cane trash. Puerto Rico.

Crepidotus sp.

*Agaricaceae.* An undetermined species on cane trash. Puerto Rico.

Curvularia spp.

*Dematiaceae. Acrothecium* spp., not specifically named, now to be referred to *Curvularia,* on dead leaves. Java and other cane regions. Wakker and

Went (l. c., p. 151) mention an *Acrothecium* associated with ring-spot lesions, but not a stage of *Leptosphaeria.* In Louisiana, a form isolated from diseased roots, but "probably of no significance."

CURVULARIA LUNATA (Wakker) Boedijn, Bull. Jard. Bot. Buitenz. III, 13-127, figs. 3-4. 1933. *Acrothecium lunatum* Wakker *in* Wakker and Went, Ziekten Suikerriet op Java, p. 196. 1898. Sacc., Syll. Fungorum 14:1089. 1899.

*Dematiaceae.* Conidia brown, somewhat curved, 3-septate, upper-central cell larger and darker than others, average 23 × 11 μ. On dead leaves and culms. Gold Coast, Hawaii, India, Java, Uganda.

CYATHUS POEPPIGII Tul., Ann. Sci. Nat. III, 1:77, pl. 4 (figs. 23-25). 1844. Sacc., Syll. Fungorum 7:37. 1888. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:219, pl. 23 (fig. 6). 1917.

*Nidulariaceae.* Peridia dark brown, deeply striate, 7-12 mm high, 5-7 mm wide at top; spores, 38-45 × 18-22 μ. On dead canes. Puerto Rico.

CYTOSPORA SACCHARI Butler, Mem. Dept. Agric. India (Bot. Ser.) 1:31, pl. VIII. 1906. Sacc., Syll. Fungorum 22:962. 1913. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:196-8, pl. 22 (fig. 1-2), pl. 28 (figs. 1-4). 1917. Kiryu, Rep. Gov't Sugar Exp. Sta. Taiwan (Formosa) 4:172-94, 2 pls. 1937.

*Phomaceae.* Mycelium killing and binding leaf sheaths, killing young shoots, forming irregular brown cankers on older stalks; infected sheaths dark red, roughened by projecting necks of pycnidia which are immersed; conidia cylindrical to curved, ends obtuse, hyaline, 3.5 × 1-1.5 μ. On leaf sheaths and stalks. *Sheath rot.*

Argentina, Barbados, Brazil, Cochin-China, Cuba, Formosa, Georgia, India, Java, Lesser Antilles, Louisiana, Philippine Islands, Puerto Rico. Averna-Sacca (Brazil) reports a perfect stage, but his organism appears different (Bol. Agric. Sao Paulo 17:619-623, 3 figs., 1916). See also *Leeina philippinensis.*

DACROMYCES SACCHARI Berk. and Br., Trans. Linn. Soc. London (2) 2:65. 1883. Sacc., Syll. Fungorum 6:800. 1888.

*Dacryomycetaceae.* Reddish-yellow gelatinous masses; spores subglobose. On charred cane. Queensland.

*Darluca melaspora* Berk. See *Microdiplodia melaspora* (Berk.) Griff. and Maubl.

DASYSCYPHA sp.

*Helotiaceae.* An undetermined species on cane trash. Puerto Rico.

*Dematium javanicum* Wakker See *Cladosporium javanicum* Wakker

DEMATIUM LEVISPORUM Speg., Anal. Mus. Nac. Hist. Buenos Aires (3) 13:443. 1910. Sacc., Syll. Fungorum 22:1357-8. 1913.

*Dematiaceae.* Conidia globose, smooth, fuliginous, 5-7 μ. On rotten culms. Argentina.

*Dendrophoma* (?) *saccharicola* Averna Sacca See *Hendersonia saccharicola* (Averna-Sacca) Trotter

DEPAZEA SACCHARI Berk.

*Phomaceae.* Reported as saprophytic on leaves, Queensland, by Caum, but no further record found.

Diaporthe sacchari Speg., Anal. Mus. Nac. Buenos Aires 19:364. 1909. Sacc., Syll. Fungorum 22:386. 1913.

*Sphaeriaceae.* Perithecia 120-150 μ diam.; asci 8-spored, 65-90 × 14-18 μ; spores subfusoid, often slightly curved, 1-septate, 20-30 × 5-7 μ. Rotten culms. Argentina.

Dictydium cancellatum (Batsch) Macbr., N. Amer. Slime-moulds, p. 172. 1899.

*Cribrariaceae.* Sporangia stipitate, brown or brownish-purple; stipe 2 to 10 times length diameter of sporangia, 5-6 mm high; spores brown to purple, smooth, 5-7 μ. On cane trash. Puerto Rico.

Dictyophora indusiata (Vent. ex Fr.) Fischer, Unter. Phall. Surinam, p. 28. 1928. Cunningham, Proc. Linn. Soc. New So. Wales 56:12. 1931. *Dictyophora phalloidea* Desv., Jour. de Bot. 2:88. 1809. Sacc., Syll. Fungorum 7:3. 1888.

*Phallaceae.* Receptacle white, hollow, 20 × 3.5 cm; pileus campanulate, dingy white, rugulose; veil coarsely net-like, white, pendant; gleba olivaceous, fetid; spores elliptical, smooth, 3.5-4.5 × 1.5-2 μ. Growing in and about cane stools suffering from root rot, but very doubtfully parasitic. Dutch E. Indies, Hawaii, Philippine Islands.

Dictyophora multicolor Berk. and Br., Trans. Linn. Soc. London ser. 2, 2:66, pl. XIV (fig. 16). 1883. Sacc., Syll. Fungorum 7:7. 1888. Cunningham, Proc. Linn. Soc. New So. Wales 56:112-13. 1931. Bouriquet, Rev. Path. Veg. and Entom. Agr. 18:220-4, pl. X. 1931. *Phallus multicolor* (Berk. and Br.) Lloyd, Myc. Writ. 2:Ph. A. 6, fig. 3. 1907.

*Phallaceae.* Receptacle white below, pink above, hollow, 16 × 3 cm; pileus conical, orange; gleba olivaceous, fetid; veil pendant, salmon-pink, with fine meshes; spores elliptical, 3-5 × 1.8 μ. Associated with root disease. Madagascar.

*Dictyophora phalloidea* Desv. See *Dictyophora indusiata* (Vent. ex Fr.) Fischer

Didymosphaeria saccharicola Speg., Anal. Mus. Nac. Buenos Aires 19:370. 1909. Sacc., Syll. Fungorum 22:175. 1913.

*Sphaeriaceae.* Perithecia 150-180 μ diam.; asci, 8-spored, 110-120 × 8 μ; paraphyses filiform; spores elongate, elliptical, 1-septate, fuliginous, 15 × 5 μ. On rotten culms. Argentina.

Dinemasporium sacchari P. Henn., Hedw. 44:71. 1905. Sacc., Syll. Fungorum 18:441. 1906.

*Discellaceae.* Pycnidia superficial, 180-200 μ diam., on amphigenous oblong or circular, pale brown spots with red-brown borders; setae black, rigid, 120-200 × 4 μ; conidia fusoid to subfalcate, hyaline, ciliate, 10-18 × 2.5-3 μ; cilia 5-10 μ. Caum states "possibly a variety of *D. gramineum* Lév." Peru.

*Dioranotropis vastatrix.*

The above combination appears in an anonymous paper in Rev. Agric. Reunion 6:5-11, 1900, the author stating that, along with *Cercospora vaginae, Ustilago sacchari,* and other "maladies cryptogamiques," it possibly occurs in Reunion, producing red or black spots on the leaf-sheaths. As a doubtful

entity, it has been listed by Caum, Clements and Shear (p. 413) and Saccardo in Syll. Fungorum 24:1321, 1928. As S. F. Ashby has pointed out (recent letter in response to our inquiry), the homopterous insect, *Dicranotropis vastatrix* Breddin is undoubtedly what the original author had in mind. This insect is listed by Krüger (Das Zuckerrohr und seine Kultur, p. 312) for Java.

*Diplodia cacaoicola* P. Henn. See *Physalospora rhodina* (Berk. and Curt.) Cke.

*Endoconidiophora adiposa* (Butl.) Davidson See *Ceratostomella adiposum* (Butl.) Sartoris

*Endoconidiophora paradoxa* (De Seynes) Davidson See *Ceratostomella paradoxa* (De Seynes) Dade

ENDOXYLINA sp.

*Sphaeriaceae.* An unnamed species on weathered stalks. Brazil.

*Epicoccum levisporum* Pat. See *Nigrospora sphaerica* (Sacc.) Mason

EPICOCCUM PURPURASCENS Ehrbg., Sylv. Myc. Berol., p. 12. 1818. Sacc., Syll. Fungorum 4:736. 1886.

*Tuberculariaceae.* Sporodochia globose, dark brown, 120-150 $\mu$ diam.; conidia subglobose, brown, verrucose, 16-22 $\mu$ diam. On dead leaves. Argentina, Southern Europe.

EPICOCCUM VULGARE Cda., Icones Fung. 1:5, fig. 90. 1837. Sacc., Syll. Fungorum 4:737. 1886. Spegazzini, Rev. Fac. Agron. y Vet. 2:255. 1896.

*Tuberculariaceae.* Conidia dark, verrucose, globose, 21-25 $\mu$ diam. On dead and rotted leaves and culms. Argentina.

ERIOSPHAERIA SACCHARI (v. Breda de Haan) Went *in* Wakker and Went, Ziekten Suikerriet op Java, pp. 153-6, col. pl. 21 (figs. 6-9). 1898. *Coleroa sacchari* v. Breda de Haan, Meded. Proefsta. v. Suikerriet *in* West-Java 3:22-24. 1892. *Venturia sacchari* (v. Breda de Haan) Sacc., Syll. Fungorum 11:306. 1895.

*Sphaeriaceae.* Perithecia imbedded in brown, superficial mycelium on irregular brown spots, 45-75 $\mu$ diam., bearing lobed processes; spores 2-celled, 11-13 $\times$ 5-6 $\mu$. On leaves. Brit. W. Indies (?), Cuba, Java, North Coast South America, Trinidad. Clements and Shear (Genera of Fungi, p. 265, 1931) refer this genus to *Gibbera*. *Red leaf spot.*

*Erwinia ananas* Serrano See *Bacillus ananas* Serrano

*Erwinia sacchari* Roldan See *Bacillus sacchari* Roldan

ERYSIPHE GRAMINIS DC., Flore Fr. 6:106. 1815. Sacc., Syll. Fungorum 1:19. 1882.

*Erysiphaceae.* Black perithecia immersed in superficial dense patches of dirty white to gray mycelium, 135-280 $\mu$ diam.; asci numerous, 4- or 8-spored; spores 20-23 $\times$ 10-13 $\mu$. On living leaves. Italy. *Powdery mildew.*

*Eurotium argentinum* Speg. See *Aspergillus argentinus* Speg.

*Eurotium herbariorum* Lk. See *Aspergillus herbariorum* (Wiggers) Fischer

*Eurotium sacchari* Speg. See *Aspergillus sacchari* Speg.

EURYACHORA SACCHARI Averna Sacca, Bol. Agric. Sao Paulo 17:618, 2 figs. 1916. Sacc., Syll. Fungorum 24:1334. 1928.

*Dothideaceae.* Stromata subepidermal, erumpent; spores fusoid, fuliginous, 29-40 $\times$ 16 $\mu$. On culms. Brazil.

EUTYPELLA SACCHARI Speg., Anal. Mus. Nac. Buenos Aires (2) 3:244. 1899. Sacc., Syll. Fungorum 16:424. 1902.

*Sphaeriaceae.* Perithecia single or loosely aggregated, 150 $\mu$ diam.; spores elliptical, obtuse at both ends, hyaline, 4-6 $\times$ 2-4 $\mu$. On rotten leaves. Argentina.

FOMES sp.

*Polyporaceae.* An unnamed species (cf. *F. melanodermus* Pat., *F. Pachyphloeus* Pat.) associated with foot rot in newly cleared fields, marked by characteristic zoning of basal parts of diseased plants (Phytopath. 17:83-94, 10 figs. 1927). Infection attempts failed. Cuba. *Zonate foot rot.*

FOMES LORENTZIANUS Kalchbr., Abhandl. Geb. Naturwiss. Ungar. Akad. d. Wiss. Budapest 8:21, pl. III (fig. 1). 1879. Sacc., Syll. Fungorum 6:151. 1888. Spegazzini, Rev. Fac. Agron. y Vet. 2:227. 1896.

*Polyporaceae.* On dead stalks. Argentina.

FULIGO SEPTICA (L.) Weber *in* Wigg., Pr. Fl. Holsat., p. 112. 1780. Spegazzini, Rev. Fac. Agron. y Vet. 2:238. 1896. Macbride and Martin, The Myxomycetes, pp. 22-23. 1934.

*Physaraceae.* Aethalium puvinate, up to 20 cm diam., 1-3 cm thick, white, yellow ochraceous, greenish to brown or deep violet; spores in mass dull black, spherical, spinulose to nearly smooth, 6 $\times$ 9 $\mu$. On cane trash. Argentina, Puerto Rico.

FUMAGO sp.

*Dematiaceae.* Sooty mold on stalks. Java. See also *Capnodium.*

FUMAGO (?) SACCHARI Speg., Rev. Fac. Agron. y Vet. 2:256. 1896. Sacc., Syll. Fungorum 14:1099. 1899.

*Dematiaceae.* On culms and lower leaves. Argentina, Brazil. *Sooty mold.*

FUSARIUM spp.

*Tuberculariaceae.* Fusaria, not specifically named, have been reported as commonly associated with root rot, wilting cane, dead and dying stalks, internal reddening of stalks, in seed cane possibly reducing germination, in top rot cases, on cane trash, as agents of sugar deterioration, etc. Argentina, Brazil, British Guiana, Cuba, Dutch E. Indies, Hawaii, India, Louisiana, Mauritius, Peru, Philippine Islands, Puerto Rico, Uganda.

FUSARIUM AVENACEUM (Fr.) Sacc., Syll. Fungorum 4:713. 1886. Wollenweber and Reinking, Die Fusarien, pp. 53-5, fig. 12. 1935.

*Tuberculariaceae.* Group *Roseum;* conidia, 3-5 septate, 30-66 $\times$ 2.5-3 $\mu$ (average). Saprophytic on dead parts. Locality not reported.

*Fusarium moniliforme* Sheldon See *Gibberella fujikuroi* (Saw.) Wr.

*Fusarium moniliforme* Sheldon var. *majus* Wr. and Reinking See *Gibberella fujikuroi* (Saw.) Wr.

*Fusarium moniliforme* Sheldon var. *subglutinans* Wr. and Reinking See *Gibberella fujikuroi* (Saw.) Wr. var. *subglutinans* Edwards

Fusarium oxysporum Schl. var. *aurantiacum* (Lk. ut sp.) Wr., Zeitschrift f. Parasitenk. 3:420. 1931. Wollenweber and Reinking, Die Fusarien, p. 121, fig. 27. 1935.

*Tuberculariaceae.* Reported on *Saccharum* by Wollenweber and Reinking (op. cit.) without detail.

Fusarium solani (Mart.) App. and Wr. var. *minus* Wr., Ann. Myc. 15:55. 1917. Wollenweber and Reinking, Die Fusarien, p. 134, fig. 30. 1935

*Tuberculariaceae.* Reported by Wollenweber and Reinking (op. cit.) on *Saccharum* without detail.

Gibberella fujikuroi (Saw.) Wr. in Nisikado, Ber. Ohara Inst. f. Landw. Forsch. 1:87-106, 4 pls. 1931. Wollenweber and Reinking, Die Fusarien, p. 99, fig. 22. 1935. *Stat. conid.=Fusarium moniliforme* Sheldon *in* Nebr. Agric. Exp. Sta. Rept. 17:23-32, illus. 1904. Sacc., Syll. Fungorum 22:1485. 1913. Wakker and Went, Ziekten Suikerriet op Java, p. 66, col. pl. VII. 1898. Bolle, Arch. Suikerindus. Ned.-Indië 1927, pp. 589-609, col. pl. 1; 1928, pp. 116-129. Priode, Phytopath. 19:343, illus., 1929; and 23:672-4, 1933. Wollenweber and Reinking op. cit., p. 262. 1935. (?) *Lisea australis* Speg. var. *sacchari* Speg., Rev. Fac. Agron. y Vet. 2:236. 1896. Sacc., Syll. Fungorum 14:640. 1899. *Gibberella moniliformis* (Sheldon) Winel., Jour. Agric. Res. 28:920, 2 pls., 6 figs. 1924. *Fusarium moniliforme* Sheldon var. *majus* Wr. and Reinking, Phytopath. 15:163-4. 1925.

*Hypocreaceae.* Microconidia in chains, 5-10 × 2-3.5 μ; conidia 3-5-, rarely 6-7-septate, 20-70 × 2-5 μ; no chlamydospores; occasional sclerotia; perithecia deep blue, .25-.33 × .22-.28 mm, paraphysate; spores 1-septate (rarely more), 14-18 × 4.4-7 μ. Causing chlorotic spots with red specks and stripes on unfolding leaves, restricting elongation and resulting in severe malformation and often top rot. Ladder-shaped lesions and cavities covered with pink powder (conidia). Infects also corn and sorghum (Priode). *Lisea australis sacchari,* doubtfully referred here, was reported by Spegazzini on rotting culms, Argentina. *Pokkah Boeng, Top rot.*

Australia, Brazil, Cuba, Dominican Republic, Fiji, Formosa, Hawaii, India, Indo-China, Japan, Java, Madagascar, Mauritius, Mexico, Peru, Philippine Islands, Puerto Rico, Reunion, Southern United States, Venezuela.

Gibberella fujikuroi (Saw.) Wr. var. subglutinans Edwards, Sci. Bull. Dept. Agric. New So. Wales 49:41, illus. 1935. *Stat. conid.=Fusarium moniliforme* Sheldon var. *subglutinans* Wr. and Reinking, Phytopath. 15:163. 1925.

*Hypocreaceae.* Differs from the species chiefly in that microconidia are not in chains. Hawaii.

*Gibberella moniliformis* (Sheldon) Wineland See *Gibberella fujikuroi* (Saw.) Wr.

Gibberella pulicaris (Fr.) Sacc., Michelia 1:317. 1879. Sacc., Syll. Fungorum 2:552. 1883. Spegazzini, Rev. Fac. Agron. y Vet. 2:236. 1896. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:213. 1917.

*Hypocreaceae.* Spores subobtuse, ovate-lanceolate, 3-septate, 18-20 × 6-8 μ. On dead stems. Argentina, Puerto Rico.

GIBBERELLA SACCHARI Speg., Rev. Fac. Agron. y Vet. 2:237. 1896. Sacc., Syll. Fungorum 14:649-650. 1889.

*Hypocreaceae.* Spores, 16 × 3.5-4 μ. On dead and rotting leaves and canes. Argentina.

GIBBERELLA SAUBINETII (Mont.) Sacc., Michelia 1:513. 1879. Sacc., Syll. Fungorum 2:554. 1883.

*Hypocreaceae.* Spores 3-septate, 18-24 × 4-5 μ. On cane trash. Argentina. The fungus causing scab of cereals has been assigned to *G. zeae* (Schw.) Petch, Ann. Mycol. 34:256-60. 1936. As reported on cane substrata, the three species above are probably identical. *G. pulicaris* has priority.

*Glenospora sacchari* Speg. See *Nigrospora sacchari* (Speg.) Mason

GLIOCLADIUM sp.

*Moniliaceae.* Isolated from diseased roots. British Guiana.

GLIOCLADIUM ROSEUM (Lk?) Brainier, Bull. Soc. Myc. France 23:111-112, pl. XV (figs. 1-6). 1907. Thom, The Penicillia, pp. 504-5. 1930. *Penicillium roseum* Lk., Obs. Myc. II, p. 37. 1816. Sacc., Syll. Fungorum 4:83. 1886.

*Moniliaceae.* Colonies white to pink or salmon; conidia colorless (pink in mass), elliptical, slightly apiculate, smooth, 5-7 × 3-5 μ. Isolated from sugar. Louisiana.

GLOMERELLA CINGULATA (Stonem.) Spaulding and v. Schrenk, Science 17:751. 1903 and U. S. Dept. Agric. Bur. Pl. Ind. Bull. 44:29, 9 pls. 1903.

*Sphaeriaceae.* Cultures from cane material. Louisiana.

GLYCYPHILA VERSICOLOR Mont., Bull. Soc. Nat. et Centr. d'Agric., p. 462. 1852. Mont., Syll. Crypt., p. 307. 1856. Sacc., Syll. Fungorum 4:11. 1886. (As *Glycophila.)*

*Moniliaceae.* Oospora-like; conidia spherical, rosy then olivaceous, agglomerated in heads. Mold on sugar. France.

GNOMONIA ILIAU Lyon, Hawaii. Sugar Plant. Assoc. (Path. and Phys. Ser.) Bull. 11:28, 1 col. pl., 10 figs. 1912. Sacc., Syll. Fungorum 24:1073. 1928. *Stat. conid.=Melanconium iliau* Lyon l. c. Sacc., Syll. Fungorum 25:582. 1931. Edgerton, Phytopath. 3:93-97, pl. 8. 1913.

*Sphaeriaceae.* Perithecia black, spherical with long curved necks, 350-450 μ diam.; spores hyaline, spindle-shaped, 1-septate, 20-25 × 3-5 μ; conidia dark brown to black, egg-shaped, nonseptate, 15-22 × 6-8 μ. Parasitic in leaf-sheaths and stems, causing the disease *Iliau.* Australia, Brazil, Cuba, Hawaii, Louisiana, Mauritius, Philippine Islands (?).

GRAPHIUM spp.

*Stilbaceae.* Caum reports undetermined species on cane leaves about the wounds caused by leaf-hoppers. Hawaii.

GRAPHIUM NODULOSUM Marchal, Bull. Soc. Belge Micros. 20:266, pl. 7 (fig. 5). 1894. Sacc., Syll. Fungorum 11:644. 1895.

*Stilbaceae.* Synnema 1-1.5 cm tall, dark; conidia ovoid, hyaline, 3.5-4.5 × 2-2.5 μ. On dead culms associated with *Nectria laurentiana* Marchal. Belgian Congo.

GRAPHIUM PISTILLARIOIDES Speg., Rev. Fac. Agron. y Vet. 2:254. 1896. Sacc., Syll. Fungorum 14:1110-11. 1899.

*Stilbaceae.* Synnema dark, 500-1000 $\mu$ tall; conidia smooth, ovate or elliptical, 4-4.5 $\times$ 2.5-3 $\mu$. On rotten leaves. Argentina, Cuba.

GRAPHIUM SACCHARI Speg., Rev. Fac. Agron. y Vet. 2:253. 1896. Sacc., Syll. Fungorum 14:1111. 1899. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:226, pl. XXVII (figs. 5-7). 1917.

*Stilbaceae.* Synnema densely aggregated, erect, 500-1200 $\times$ 20-40 $\mu$; conidia ellipsoid or oval, hyaline, smooth, 5-7 $\times$ 4 $\mu$. On dead stalks, leaf blades and sheaths. Argentina, Dominican Republic, Puerto Rico.

GUEPINIA PALMICEPS Berk., Ann. Mag. Nat. Hist. 10:383, fig. 14. 1843. Sacc., Syll. Fungorum 6:809. 1888.

*Dacryomycetaceae.* Fruiting bodies stipitate, firm, gelatinous; tips yellow-red; spores not recorded. Dead stalks. Puerto Rico.

*Guepinia spathulata* Jungh. See *Guepinia spathularia* (Schw.) Fr.

GUEPINIA SPATHULARIA (Schw.) Fr., Elench. Fungorum 2:32. 1828. Sacc., Syll. Fungorum 6:807. 1888.

*Dacryomycetaceae.* Fruiting bodies spathulate, erect, stipitate, yellow, gelatinous, drying corneous, .5-2 cm tall; hymenium orange-yellow, rugose; spores smooth, orange-yellow, elliptical, on long deeply bipartite basidia, 7.4-9.5 $\times$ 3.8-4.5 $\mu$. On dead stalks. Puerto Rico. Erroneously reported (Jour. Dept. Agric. P. Rico 1:215, 1917) as *G. spathulata* Jungh.

GYMNOASCUS REESSII Baranetzky, Bot. Zeit. 30:158. 1872. Sacc., Syll. Fungorum 8:823. 1889.

*Gymnoascaceae.* Fruiting bodies 1 mm diam., golden yellow; spores globose or ovoid, brown, 4-5 $\times$ 3-3.5 $\mu$. On dead stalks. Java.

*Gymnosporium arundinis* Cda. See *Coniosporium arundinis* (Cda.) Sacc.

*Gymnosporium vinosum* Berk. and Curt. See *Papularia vinosa* (Berk. and Curt.) Mason

HANSENIA APICULATA (Reess) Lindner var. SACCHARI, Racib. Arch. v. d. Java Suikerind. 6:484, 1 fig. 1898. Guilliermond and Tanner, The Yeasts, pp. 273-4, 1 fig. 1920. *Saccharomyces apiculata* Reess var. *sacchari* Racib., l. c. Delacroix, Maladies Plant. Cult. dans des Pays Chauds, p. 538. 1911.

*Saccharomycetaceae.* Cells lemon-shaped, 4 $\times$ 2 $\mu$. Causing reddish bordered, gray, watery areas in seed-cuttings resulting in death of young dependent plants. Also as a sugar fermenting agent (?). Java. Clements and Shear (The Genera of Fungi, p. 246, 1931) propose *Thelis* to replace *Hansenia.*

HAPLOGRAPHIUM CHLOROCEPHALUM (Fres.) Grove subsp. DENSUM Sacc., Ann. Myc. 9:256. 1911. Sacc., Syll. Fungorum 22:1354. 1913.

*Dematiaceae.* Fascicles denser than in the species, sordid olivaceous; conidial heads 50-60 $\mu$ diam.; conidia catenulate, spherical, 1-guttulate, smooth, ochraceous to olivaceous, 4 $\mu$ in diam. On rotting canes. Madeira. Clements and Shear (The Genera of Fungi, p. 393, 1931) consider the genus synonymous with *Cephalotrichum.*

HAPLOGRAPHIUM SACCHARI Speg., Rev. Fac. Agron. y Vet. 2:249. 1896. Sacc., Syll. Fungorum 14:1076. 1899.

*Dematiaceae.* Conidiophores erect, rigid, dark, branched, 150-250 × 10-14 μ; conidia acrogenous, catenulate, globose, minutely roughened, dark-fuliginous, 6-10 μ. On dead and dying leaves and leaf-sheaths. Argentina.

*Haplosporella melanconioides* Sacc. See *Melanconium sacchari* Mass.

HAPLOSPORELLA SACCHARI da Camara, Anais do Inst. Sup. Agron. 3:108, figs. 75-77. 1930.

*Phomaceae.* Pycnidia erumpent, conidia 1-guttulate, brown, 19-25 × 9-11 μ. On culms. Portugal.

HELMINTHOSPORIUM sp.

*Dematiaceae.* Conidia light brown, slightly curved, 76 × 15 (average) μ. Associated with irregular concentric rings or zonate spots on leaves and spindles which may coalesce to cover entire area of affected leaves, deep brown. Cuba. Described by Priode, Phytopath. 21:41-57, 1 col. pl., figs. 1-7. 1931. See also McRae, Sci. Repts. Imp. Inst. Agr. Res. India 1931-32, p. 129.

*Target-blotch.*

HELMINTHOSPORIUM HALODES Drechsler, Jour. Agric. Res. 24:709, pls. 22, 23 (figs. a-g.) 1923. Subramaniam, Indian Jour. Agr. Sci. 6:11-16, pl. IX-XI (1 col.). 1936.

*Dematiaceae.* Conidiophores 60-150 × 4-7 μ; conidia brownish yellow, apices rounded, 1-12 septate, 20-105 × 10-14 μ. Cause of seedling disease. India.

HELMINTHOSPORIUM NODULOSUM Berk. and Curt., Grevillea 3:102. 1875. Sacc., Syll. Fungorum 4:421. 1886. McRae, Sci. Repts. Imp. Inst. Pusa, 1930-31:73-86. 1932. Mitra and Mehta, Indian Jour. Agr. Sci. 4:943-75. 1934.

*Dematiaceae.* Inadequately described. Small leaf-spots found on sugar-cane from inoculations. India.

*Helminthosporium ocellum* Faris See *Helminthosporium sacchari* (v. Breda de Haan) Butler

HELMINTHOSPORIUM SACCHARI (v. Breda de Haan) Butler, Mem. Dept. Agric. India (Bot. Ser.) 6:207, pl. 6. 1913. Sacc., Syll. Fungorum 25:823. 1931. Johnston and Stevenson, Jour. Dept. Agric. Puerto Rico 1:202-3. 1917. Lee et al, Hawaii. Planters' Rec. 30:466-92. 1926. Mitra, Trans. Brit. Myc. Soc. 15:259-60, 289-90; 16:123-25. 1931. *Cercospora sacchari* v. Breda de Haan, Meded. Proefsta. Suikerriet West-Java 3:15-21. 1892. Sacc., Syll. Fungorum 11:629. 1895. Wakker and Went, Ziekten Suikerriet op Java, pp. 157-61, col. pl. 21 (figs. 1-5). 1898. *Helminthosporium ocellum* Faris, Phytopath. 18:757, col. pl. XV (figs. 3, 5, 7). 1928. Mitra (l. c.) and McRae (Sci. Repts. Imp. Inst. Agr. Res. 1931-32, pp. 129-30) report cultural and infection comparisons showing this fungus to be merely a strain of *H. sacchari*. Bourne (Fla. Agric. Exp. Sta. Bull. 267, p. 76, 1934) considers this fungus the primary cause of "ring spot" in Florida.

*Dematiaceae.* Conidiophores yellowish brown, 70-380 × 3.5-5 μ; conidia olive-green to brown, cylindrical, oblong or elliptical, often slightly curved, 3-10 septate, 22-110 × 9-21 μ. (Mitra gives 30-112 ×11.5-18.5 μ.) The fungus is highly variable, apparently existing as a number of different strains with saltation common. Leaf spots straw colored, red bordered, and often extending or coalescing into long streaks with indefinite halo. *Eye spot.*

Argentina, Australia, Brazil, Central America, Colombia, Cuba, Dominican Republic, Dutch East Indies, Dutch Guiana, Fiji, Florida, Georgia, Haiti, Hawaii, India, Jamaica, Lesser Antilles, Mauritius, Peru, Philippine Islands, Puerto Rico, Reunion, Singapore Island, Trinidad, Uganda, Union So. Africa, Venezuela.

HELMINTHOSPORIUM STENOSPILUM Drechsler, Phytopath. 18:135-6. 1928. Faris, Phytopath. 18:753-74. 1928.

*Dematiaceae.* Conidiophores dark olivaceous, erect, slightly bulbous at base, 120-260 μ; conidia dark olivaceous, 3-12 septate, 84 × 17 μ. Causes vandyke brown, linear, stripes with scant halos, up to 20 × 3 mm. Brazil, Cuba, Dominican Republic, Formosa, Guam, Hawaii, India (?), Puerto Rico, Southern United States, Queensland. An ascigerous stage, *Ophiobolus stenospilus* Carp. (nom. nud.) was obtained by C. W. Carpenter in pure cultures originating from single spores of this *Helminthosporium.* (See Proc. Internat. Soc. Sugar Cane Tech. (4) Bull. 128:7, 1933.) Matsumoto and Yamamoto (Jour. Plant Prot. 23:9-14, 1936) also obtained an ascigerous stage and referred it to the more appropriate new genus *Cochliobolus,* as *C. stenospilus* (Carp.) Matsumoto and Yamamoto (nom. nud.). *Brown stripe.*

HELMINTHOSPORIUM TETRAMERA McKinney, U. S. Dept. Agric. Bull. 1347:33, fig. 5. 1925. Subramaniam, Indian Jour. Agr. Sci. 6:11-16. 1936.

*Dematiaceae.* Conidiophores dark olivaceous to brown, irregular; conidia borne in clusters of 2-50, tapering to rounded ends, chiefly 4-celled, 20-40 × 8.5-20 μ. Cause of seedling disease. India.

HELMINTHOSPORIUM TURCICUM Pass., Boll. Comiz. Agr. Parmense 10:2. 1876. Sacc., Syll. Fungorum 4:420. 1886. Mitra, Mem. Dept. Agr. India (Bot. Ser.) 11:219-240. 1933.

*Dematiaceae.* Conidia 5-8 septate, 85-92 × 20-24 μ. Usually as a parasite on leaves of *Zea mays,* but reported from India as "growing freely on sugarcane"; forming dirty straw-colored leaf spots in infection experiments.

HENDERSONIA SACCHARI Speg., Rev. Fac. Agron. y Vet. 2:241. 1896. Sacc., Syll. Fungorum 14:959. 1899.

*Phomaceae.* Pycnidia globose depressed in linear groups between leaf veins, 100-120 μ; conidia linear fusoid, 3-septate, olivaceous, 18-22 × 3-4 μ. Indefinite pale brown spots with reddish or yellow tints on leaves and sheaths. Argentina.

HENDERSONIA SACCHARICOLA (Averna Sacca) Trotter *in* Sacc., Syll. Fungorum 25:383. 1931. *Dendrophoma* (?) *saccharicola* Averna Sacca, Molestias Cryptog. da Canna de Assucar. São Paulo, p. 30, fig. 296. 1916. Averna Sacca, Bol. Agric. São Paulo 17:637-8, 1 fig. 1916.

*Phomaceae.* Pycnidia spherical, immersed in spots on leaves; sporophores

septate, branched; conidia olivaceous, cylindrical, 3-6 septate, ends obtuse, 18-50 × 8 μ. On stalks. Brazil.

HENDERSONINA SACCHARI Butler, Mem. Dept. Agric. India (Bot. Ser.) 6:198, pls. I, III-V. 1913. Butler, Fungi and Disease in Plants, p. 388. 1918. Sacc., Syll. Fungorum 25:395. 1931.

*Phomaceae.* Pycnidia stromate, erumpent; conidia of two types, one straight or curved, ellipsoid or elongate, ends obtuse, continuous or 1-2 septate, 15-24 × 3.75-5 μ; second type filiform, 20-60 × .6-.2 μ. Causing wilt of canes with internal red rot. Clements and Shear (The Genera of Fungi, p. 369, 1931) consider this a doubtful genus. Argentina, Ceylon, India, Mauritius, Philippine Islands. *Collar rot.*

HIMANTIA GUTTULIFERA Speg., Rev. Fac. Agron. y Vet. 2:257. 1896. Sacc., Syll. Fungorum 14:1196. 1899.

*Mycelia sterilia.* Yellow or rosy mycelial masses between leaf-sheaths, sterile; hyphae yellow, branched, septate, no crystals. On rotten leaves and sheaths. Argentina.

HIMANTIA SACCHARI Speg., Rev. Fac. Agron. y Vet. 2:257. 1896. Sacc., Syll. Fungorum 14:1195. 1899.

*Mycelia sterilia.* White mycelial masses in rotten culms, no crystals. Argentina.

HIMANTIA STELLIFERA Johnston, Jour. Dept. Agric. P. Rico 1:188, pls. XIX (fig. 2), XXI (figs. 1-4). 1917. Sacc., Syll. Fungorum 25:1005. 1931.

*Mycelia sterilia.* Mycelium sterile, white, cobwebby, ascending and binding together lower leaf-sheaths, penetrating roots; hyphae with clamp connections, bearing stellate crystals on short lateral branches. Possibly a form of *Odontia saccharicola* Burt (q.v.). *Stellate-crystal fungus.*

Argentina, Barbados, Brazil, British Guiana, Cuba, Dominican Republic, Hawaii, Jamaica, Java, Lesser Antilles, Madagascar, Natal, Puerto Rico, St. Croix, Trinidad, Union South Africa.

HORMIACTELLA SACCHARI Johnston, Jour. Dept. Agric. P. Rico 1:235, pls. XXV (fig. 4), XXX (figs. 1-5). 1917. Sacc., Syll. Fungorum 25:803-4. 1931.

*Dematiaceae.* Sori black, about 1 mm diam.; sterile hyphae erect, black, septate, 500-900 μ; fertile hyphae branching, 200-300 μ; conidia spherical, catenate, 6 μ. On dead leaves. Dominican Republic, Puerto Rico, Hawaii (?).

HORMISCIUM SACCHARICOLUM Reichert, Engl. Bot. Jahrbuch. 56:718, pl. III (fig. 10). 1921.

*Dematiaceae.* Pustules effuse, confluent; conidia disc-shaped or tesselate, fuscous, 5-13 × 2.5-6 μ. On dead stems of *Saccharum biflorum* (= *S. spontaneum*). Egypt.

HORMODENDRON CLADOSPORIOIDES (Fres.) Sacc., Michelia 2:148. 1880. Sacc., Syll. Fungorum 4:310. 1886.

*Dematiaceae.* Conidia lemon-shaped, continuous or rarely 2-septate, olivaceous, 4.5-6 × 3 μ. Olivaceous mold on sugar. Union South Africa.

HYDNUM SACCHARI Sprengel, K. Svenska Vet. Akad. Handl. 1820:51. 1820. Sacc., Syll. Fungorum 6:460. 1888.

*Hydnaceae.* Hymenium yellow, effuse, resupinate. Not a *Hydnum,* as that genus is now understood. On dead cane stalks and leaves. Guadeloupe, Puerto Rico.

*Hypochnus centrifugus* (Lev.) Tul. See *Sclerotium rolfsii* Sacc.

HYPOCHNUS SACCHARI Speg., Rev. Fac. Agron. y Vet. 2:227. 1896. Sacc., Syll. Fungorum 14:226. 1899.

*Thelephoraceae.* Mycelium arachnoid, white (or rosy); spores ovate, hyaline, 10-12 × 4-5 μ. Not *Hypochnus,* as that genus is now understood. On unfolding leaves of canes attacked by "Polvillo." Argentina, Jamaica (?). A Cuban report of this species was later referred to *Odontia sacchari* Burt.

HYPOCHNUS (CORTICIUM) SASAKII Shirai, Bot. Mag. Tokyo 20:319-23. 1906. Butler, Fungi and Disease in Plants, p. 410. 1918. Sacc., Syll. Fungorum 21:415. 1912. Subramaniam, Imp. Counc. Agr. Res. Misc. Bull. 10:22-23. 1936.

*Thelephoraceae.* Sclerotia soft, white, becoming brown and hard, variable in size and shape; hymenium dusty white; basidia hyaline, obovate, 10-16 × 8-9 μ; spores hyaline, obovate or slightly cylindrical, more or less flattened, 6-10 × 4-7 μ. More properly a *Corticium.* Causes a disease known in Formosa as "Kohan-hyô." On leaf blades and sheaths and stalks, "characterized by yellowish-brown to grayish-brown patches enclosed by a purplish-brown irregular band, somewhat resembling the markings of the fur of a tiger after which the Japanese name was given." This is apparently the *"banded sclerotial disease"* or *"djamoer oepas"* reported as due to *Sclerotium* sp. See Butler (l. c.); Wakker and Went, Ziekten Suikerriet op Java, p. 134-40, pl. 16 (col.), 1898; and Matsumoto, Yamamoto and Hirane, Jour. Soc. Trop Agric. Formosa 5:332-5, 4 figs. 1933. Australia, Dutch East Indies, Formosa, India, Philippine Islands, Siam. See also *Rhizoctonia grisea.*

*Hypocrea gelatinosa* (Tode) Fr. See *Chromocrea gelatinosa* (Tode) Seaver

HYPOCREA RUFA (Pers.) Fr., Summa Veg. Scand., p. 383. 1849. Sacc., Syll. Fungorum 2:520. 1883. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:213. 1917.

*Hypocreaceae.* Stromata brick-red, subhemispheric to patellate, surfaces roughened by necks of perithecia, 2 mm to 1 cm diam.; perithecia immersed, globose, 175-200 μ diam.; spores globose, hyaline, 3-4 μ diam. On dead cane stalks. Colombia, Puerto Rico.

HYPOCREA SACCHARALIS Racib., Parasit. Algen u. Pilze Javas III, pp. 21-22, 43. 1900. Sacc., Syll. Fungorum 16:583-4. 1902.

*Hypocreaceae.* Stromata brown, circular, 2-3 mm diam.; perithecia immersed, oval, 220-240 μ high, 120-150 μ wide; asci 8-, finally 16-spored; spores globose or ovate, 2-3.5 μ diam. On living leaf-sheaths. Java.

Hypocrea sacchari Went, Arch. v.d. Java Suikerind. 1:455, pl. VII (figs. 8-10). 1893. Sacc., Syll. Fungorum 11:362. 1895. Wakker and Went, Ziekten Suikerriet op Java, p. 193. 1898.

*Hypocreaceae.* Stromata pulvinate-depressed, pale fuscous, 2-4 mm diam.; spores 2-celled (?), smoky olive; upper cell globose, 4 $\mu$ diam.; lower oblong, 6 $\times$ 4 $\mu$. On leaf blades and sheaths, killing seedlings. Java. Went includes a conidial stage, *Verticillium sacchari* Went.

*Ithyphallus celebicus* P. Henn. See *Ithyphallus rubicundus* (Bosc) Fischer

*Ithyphallus coralloides* Cobb See *Ithyphallus rubicundus* (Bosc) Fischer

Ithyphallus rubicundus (Bosc) Fischer, Jahrb. Bot. Gart. u. Mus. Berlin 4:50. 1886. Sacc., Syll. Fungorum 7:11. 1888. Cunningham, Proc. Linn. Soc. New So. Wales 55:10-11. 1931. *Phallus rubicundus* (Bosc) Fr., Syst. Myc. 2:284. 1822. *Phallus celebicus* P. Henn., Monsunia 1:21. 1899. *Ithyphallus celebicus* (P. Henn.) Sacc. and Syd. *in* Sacc., Syll. Fungorum 16:225. 1902. *Ithyphallus coralloides* Cobb, Hawaii. Sugar Plant. Exp. Sta. (Path. and Phys. Ser.) Bull. 5:208, figs. 97-99. 1906.

*Phallaceae.* Receptacle variable, fusiform or cylindrical, up to 18 cm tall and 3 cm diam., scarlet; pileus conical, scarlet, slightly rugulose; gleba external, fetid, olivaceous; spores smooth, elliptical, 3.5-5 $\times$ 1.5-2 $\mu$. Associated with root disease, and on cane trash. Saprophytic. Hawaii, Java. *Stink-horn.*

Lachnea cubensis (Berk. and Curt.) Sacc., Syll. Fungorum 8:176. 1889. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:215. 1917.

*Pezizaceae.* Cups scarlet, with rigid brown marginal setae; spores broadly elliptical, 18-20 $\times$ 11 $\mu$. On dead cane leaves. Puerto Rico.

*Lasiodiplodia theobromae* (Pat.) Griff. and Maubl. See *Physalospora rhodina* (Berk. and Curt.) Cke.

Lasiosphaeria sp.

*Sphaeriaceae.* An undetermined species on dead canes. Puerto Rico.

*Laternea columnata* (Bosc) Nees See *Clathrus columnatus* Bosc

Leeina philippinensis Petr., Ann. Myc. 21:315. 1923.

*Phomaceae.* Pycnidia in subepidermal stromata, spherical, 200-350 $\mu$ diam.; conidia hyaline, 1-celled, 2-3 $\times$ .75-1 $\mu$; conidiophores 6-11 $\mu$ long. On dead leaves and stems. India, Philippine Islands. Petrak suggests that *Cytospora sacchari* Butl. belongs here and adds "Jedenfalls scheint Butler's Pilze keine *Cytospora* zu sein." Clements and Shear (Genera of Fungi, p. 370, 1931) place the genus in "Genera dubia."

Lentinus crinitus (L.) Fr., Syst. Orbis Veg., p. 77. 1825. Sacc., Syll. Fungorum 5:576. 1887.

*Agaricaceae.* Pileus convex to infundibuliform, 4-7 cm broad; surface pale fawn-colored to dark reddish-brown, covered with stiff squamose dark fuscous hairs; lamellae decurrent; stipe central, glabrous, silky at apex, 2-4 cm long, 3 mm thick. On dead cane. Puerto Rico.

Lepiota lycoperdinea Speg., Anal. Mus. Nac. Buenos Aires (2) 3:87. 1899. Sacc., Syll. Fungorum 16:6. 1902.

*Agaricaceae.* Growing in cane fields. Argentina.

LEPTOSPHAERIA sp.

*Sphaeriaceae.* An undetermined species associated with "Giant ring spot." Hawaii. On leaves. Formosa.

LEPTOSPHAERIA SACCHARI v. Breda de Haan, Med. v. het Proefsta. v. Zuikerriet in West-Java 3:25-28. 1892. Sacc., Syll. Fungorum 11:324. 1895. Spegazzini, Rev. Fac. Agron. y Vet. 2:232. 1896. Wakker and Went, Ziekten Suikerriet op Java, pp. 149-153, pl. XX (col.). 1898. Butler, Mem. Dept. Agric. India (Bot. Ser.) 1:45-47, pl. 6 (figs. 22-25). 1906. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:203, pls. XXV (fig. 1), XXXI (figs. 5, 6). 1917. Bourne, Fla. Agric. Exp. Sta. Bull. 267, 76 pp., 23 figs. 1934.

*Sphaeriaceae.* Perithecia 120-150 $\mu$ diam., black, subepidermal, paraphysate; spores 2-3 septate, 25 $\times$ 10 $\mu$. On living leaves, producing numerous oval (5-10 mm wide $\times$ 7-15 mm long), dull gray to straw-colored spots with definite red to red-brown margins.

Bourne (l.c.) considers *L. sacchari* a saprophyte merely associated with *Helminthosporium ocellum* Faris, "the primary cause of the disease." A conidial stage (a *Dematium?*) was suggested by de Haan, later assigned to *Acrothecium* by Wakker and Went (l.c.) who disclaimed its connection with *Leptosphaeria.* Conidia "appear to belong to *Acrothecium lunatum* group"—Mason. Van der Bijl (Jour. Dept. Agric. So. Africa 2:123, 1921) mentions a *Phoma* as a stage of *Leptosphaeria sacchari.* Bourne (l.c.) obtained a pycnidial stage in pure cultures originating from single ascospores of the *Leptosphaeria* and refers this to *Phyllosticta saccharicola* P. Henn. Matsumoto and Yamamoto (Jour. Plant. Prot. 23:9-14, 1936) substantiate the genetic connection with a species of Phyllosticta. *Ring spot.*

Andaman Islands, Antigua, Argentina, Australia, Barbados, Belgian Congo, Brazil, British Guiana, Burma, Central America, Ceylon, China, Colombia, Cuba, Dominican Republic, Dutch Guiana, Fiji, Formosa, Gold Coast, Guadeloupe, Haiti, Hawaii, Honduras, India, Indo-China, Jamaica, Japan, Java, Kenya, Lesser Antilles, Madagascar, Mauritius, Mexico, Peru, Philippine Islands, Puerto Rico, Reunion, Sierra Leone, Southern United States, Sumatra, Surinam, Tanganyika, Trinidad, Uganda, Union So. Africa, Venezuela.

*Leptosphaeria sacchari* Speg. See *Leptosphaeria spegazzinii* Sacc. and Syd.

LEPTOSPHAERIA SACCHARICOLA P. Henn., Hedw. 39:79 (Beibl.). 1900. Sacc., Syll. Fungorum 16:516-17. 1902.

*Sphaeriaceae.* Perithecia membranous, black, subglobose, 100-120 $\mu$ diam.; spores brown, 3-4 septate, 15-19 $\times$ 4 $\mu$. On living leaves producing pale, oblong, brown bordered spots. Brazil.

LEPTOSPHAERIA SPEGAZZINII Sacc and Syd *in* Sacc., Syll. Fungorum 14:570. 1899. *Leptosphaeria sacchari* Speg., Rev. Fac. Agron. y Vet. 2:232. 1896.

*Sphaeriaceae.* Perithecia amphigenous, immersed, 120-140 $\mu$ diam.; spores fusoid, acute at ends, 3-septate, constricted at septae, 25 $\times$ 5-6 $\mu$. On dead and dying leaves producing indefinite pale spots. Argentina.

Leptosphaeria spegazzinii Sacc. and Syd. var. minor Speg., Anal. Mus. Nac. Buenos Aires 19:383. 1909. Sacc., Syll. Fungorum 22:233. 1913.

*Sphaeriaceae.* Perithecia 100-120 $\mu$ diam.; spores 16-18 $\times$ 4-5 $\mu$. On culms. Argentina.

Leptosphaeria tucumanensis Speg., Rev. Fac. Agron. y Vet. 2:232. 1896. Sacc., Syll. Fungorum 14:569-70. 1899.

*Sphaeriaceae.* Spores obtuse at ends, 5-7 septate, fusoid, 18-20 $\times$ 3-4 $\mu$. On culms. Argentina.

Leuconostoc mesenterioides (Cienk.) v. Tiegh., Ann. des Sci. Nat., ser. VI, 7:180. 1878. Spegazzini, Rev. Fac. Agron. y Vet. 2:239. 1896. Sacc., Syll. Fungorum 8:1052. 1889. Bergey's Man. Deter. Bact., ed. 1, p. 45. 1923.

*Coccaceae.* Organism spherical, .9-1.2 $\mu$ diam., in pairs or chains which in sugar solutions are surrounded by a thick, gelatinous, colorless membrane. Produces slime in sugar solutions in sugar mills and refineries. Argentina, Java. Zopf (Beitr. z. Physiol. u. Morph. nied. Organismen, heft 1:1-28, 1892) suggests that the Javanese organism be considered as var. *indica,* because of minor differences in physiological response. See also Winter, Arch. Java Suikerrind. 1:282-288. 1893.

*Ligniera vascularum* (Matz) Cook See *Plasmodiophora vascularum* Matz

Linospora sacchari Averna Sacca., Bol. Agric. Sao Paulo 17:614, 1 fig. 1916. Sacc., Syll. Fungorum 24:1061-2. 1928.

*Sphaeriaceae.* Perithecia globose, immersed; spores filiform, hyaline, continuous, 108-120 $\times$ 3 $\mu$. On culms. Argentina, United States.

*Lisea australis* Speg. var. *sacchari* Speg. See *Gibberella fujikuroi* (Saw.) Wr.

Lophodermium sp.

*Hysteriaceae.* An unnamed species on dead leaf-sheaths. Puerto Rico.

Lophodermium sacchari Lyon, Hawaii. Plant. Record 9:600-601; Bull. Exp. Sta. Hawaii. Sugar Plant. Assoc., Bot. Ser., 3:76, 3 figs. 1921. Sacc., Syll. Fungorum 24:1126. 1928.

*Hysteriaceae.* Perithecia black, erumpent, 1-3, rarely 4 mm long, .25-.5 mm wide; paraphyses bulb-tipped, some branched; spores hyaline, acicular, 48-55 $\times$ 1-1.5 $\mu$. On mid-ribs and leaf-sheaths of dead leaves. Hawaii.

Lycogala epidendrum (L.) Fr., Syst. Myc. 3:80. 1829. Macbride and Martin, The Myxomycetes, p. 243. 1934.

*Lycogalaceae.* Aethalia depressed, spherical, olivaceous or blackish, 3-10 mm diam.; spores minutely reticulate, 5-6 $\mu$ diam. On trash. Dominican Republic, Puerto Rico.

Lycoperdon albinum Cke., Jour. Roy. Micro. Soc. 1887:723. 1887. Sacc., Syll. Fungorum 7:487. 1888.

*Lycoperdaceae.* Fruiting bodies globose, white, not over 1 cm diam.; spores smooth, globose, 3 $\mu$. On very rotten cane trash. Puerto Rico.

Lycoperdon pusillum Batsch, Elen. Fung. 3:124, pl. XLI (fig. 228). 1789. Sacc., Syll. Fungorum 7:487. 1888.

*Lycoperdaceae.* Fruiting bodies 6-16 mm diam.; spores ochraceous olivaceous, globose, 4 $\mu$. On cane trash. Puerto Rico.

LYCOPERDON PYRIFORME Schaeff., Icon. Fung., p. 128, tab. 185. 1763. Sacc., Syll. Fungorum 7:117. 1888.

*Lycoperdaceae.* Plants pyriforme, up to 4.5 cm broad and high, red-brown when dry; cortex of minute warts and granules, rough to touch; spores spherical, smooth, deep olive-brown, 3.8-4.3 μ. On cane trash. Puerto Rico.

MACROPHOMA SACCHARI (Cke.) Berl. and Vogl., Atti Soc. Ven.-Trentina Sci. Nat. 10:186. 1886. *Sphaeropsis sacchari* Cke., Grev. 12:23. 1883. *Phoma sacchari* (Cke.) Sacc., Syll. Fungorum 3:166. 1884.

*Phomaceae.* Pycnidia black, subglobose, erumpent; conidia hyaline, lanceolate, 32-42 × 12 μ. On dead culms. Georgia (U.S.A.), Italy. Cobb tentatively used the binomial *(Phoma sacchari)* for a fungus associated with what he called "cane freckle." New So. Wales.

MACROPHOMINA PHASEOLI (Maubl.) Ashby, Trans. Brit. Myc. Soc. 12:145. 1927. *Sclerotium bataticola* Taub., Phytopath. 3:161-4. 1913. *Rhizoctonia bataticola* (Taub.) Butler ex Britton-Jones, Min. Agric. Egypt, Tech. and Sci. Ser. Bull. 49:65. 1925.

*Phomaceae.* Minute black sclerotia in and on roots; pycnidia black, immersed to erumpent, globose, 100-200 μ diam.; conidia hyaline, 1-celled, elliptical, or oval, 16-29 × 6-9 μ. On roots and base of stalks. Egypt, India.

MACROSPORIUM GRAMINUM Cke. *in* Ravenel and Cook, Fungi Amer. Exsic., No. 606, 1882, and Grevillea 17:66. 1889. Sacc., Syll. Fungorum 10:677. 1892.

*Dematiaceae.* Conidia fuscous, 4-5 septate, muriform, 60-70 × 22 μ. An *Alternaria* in the *A. tenuis* group of Elliott (Amer. Jour. Bot. 4:447. 1917). On dead leaves. Hawaii, New So. Wales, Tasmania.

MARASMIUS spp.

*Agaricaceae.* Unnamed species occurring on cane trash or associated with root disease, etc., many of which are probably *M. sacchari.* Argentina, Barbados, British Guiana, Cuba, Indo-China, Java, Mauritius, Peru, Philippine Islands, Queensland, St. Croix, Trinidad, Union So. Africa.

MARASMIUS BAMBUSINUS Fr., Linnaea 5:507. 1830. Sacc., Syll. Fungorum 5:543. 1887.

*Agaricaceae.* A small white species. On dead canes. Cuba.

MARASMIUS BORINQUENSIS Stevenson, Jour. Dept. Agric. P. Rico 1:218. 1917. Sacc., Syll. Fungorum 23:161. 1917.

*Agaricaceae.* Pileus up to 3 mm broad, radiate-sulcate, glabrous, white, yellow on drying, lamellae few, distant, white; stipe 2-6 mm long, concolorous; spores elliptical-ovoid, 7 × 5 μ. On cane trash. Puerto Rico.

MARASMIUS HIORAMI Murrill, No. Amer. Fl. 9:256. 1915. Sacc., Syll. Fungorum 23:151. 1925.

*Agaricaceae.* Pileus 3-4 mm broad; surface bay, glabrous, radiate-sulcate; gills broad, adnate; stipe fuliginous to black, smooth, polished, 2-3 cm long. On cane trash. Puerto Rico.

MARASMIUS PLICATUS Wakker *in* Wakker and Went, Ziekten Suikerriet op Java, p. 195. 1898. Sacc., Syll. Fungorum 14:115. 1899.

*Agaricaceae.* Stipe central, filiform; pileus broadly campanulate, plicate, brown; lamellae about 7; spores ovoid, hyaline, with rounded apex, 6-8 × 4-5 μ.

On dead leaves. Java, Philippine Islands. New World reports of the occurrence of this species associated with root rot should be referred apparently to *M. stenophyllus* (Johnston, Mycologia 8:115. 1916.).

Marasmius sacchari Wakker, Arch. v. d. Java Suikerind. 3:577-9, 5 figs. 1895. Centralbl. f. Bakt. u. Par. II, 2:44. 1896. Wakker and Went, Ziekten Suikerriet op Java, pp. 49-63, pl. V. 1898. Sacc., Syll. Fungorum 14:115. 1899. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:183-7, pls. XX (fig. 1), XXVI (figs. 9-10). 1917.

*Agaricaceae.* Pileus campanulate, white, finally sordid white, up to 15 mm diam.; lamellae white, simple or bifurcate; stipe central, white, 15 mm long; spores hyaline, irregularly oblong, attenuate at both ends, 16-20 × 4-5 μ. On dead and dying cane. Associated with the root disease complex.

American Virgin Islands, Antigua, Australia, Barbados, Brazil, British Guiana, British Virgin Islands, Colombia, Cuba, Dominica, Dominican Republic, Fiji, Formosa, Granada, Guadeloupe, Hawaii, India, Jamaica, Java, Martinique, Mauritius, Montserrat, Nevis, Philippine Islands, Puerto Rico, St. Kitts, St. Lucia, St. Vincent, Trinidad.

Marasmius sacchari Wakker var. hawaiiensis Cobb, Exp. Sta. Hawaii. Sugar Plant. Assoc. Bull. (Path. and Phys. Ser.) 5:230, pl. VII. 1906. Sacc., Syll. Fungorum 23:162. 1925.

*Agaricaceae.* Spores shorter (12-16 × 4-5 μ) than in the species. Associated with root rot. Hawaii. Usually considered synonymous with the species.

*Marasmius semiustus* Berk. and Curt. See *Marasmius stenophyllus* Mont.

Marasmius stenophyllus Mont., Ann. Sci. Nat. IV, 1:116. 1854. Sacc., Syll. Fungorum 5:549. 1887. Murrill, N. Amer. Flora 9:262. 1916. *Marasmius semiustus* Berk. and Curt., Jour. Linn. Soc. 10:296. 1868.

*Agaricaceae.* Pileus membranaceous, convex-plane, 5-7 mm wide, pale yellowish to reddish tan; lamellae adnate; stipe tough, solid or spongy, central, or excentric with age, 8-15 mm tall, 1-2 mm thick; spores ellipsoid, smooth, hyaline, 7-9 × 5-6 μ. Associated with root rot. Cuba, Louisiana, Mississippi, Texas, Trinidad. Puerto Rico report not confirmed. New World reports of *M. plicatus* are referred to this species.

Marasmius synodicus (Kze.) Fr., Epicr. Myc., p. 381. 1838. Sacc., Syll. Fungorum 5:533. 1887. Murrill, No. Amer. Flora 9:257. 1916.

*Agaricaceae.* Pileus convex to expanded, 6-10 mm, white or pallid, sulcate; stipe whitish, 1-2 cm long, 1 mm thick; spores smooth, ellipsoid, 6 × 4 μ. On cane trash. Puerto Rico.

Marsonia sp.

*Melanconiaceae.* An unnamed species on midribs of dead leaves. Puerto Rico.

*Melanconium iliau* Lyon See *Gnomonia iliau* Lyon

*Melanconium lineolatum* Sacc. See *Papularia vinosa* (Berk. and Curt.) Mason

Melanconium sacchari Massee ap. Speg., Rev. Fac. Agron. y Vet. 2:242. 1896. Sacc., Syll. Fungorum 14:1019. 1899. Op. cit. 25:582. 1931. *Strumella*

*sacchari* Cke., Grev. 19:45. 1890. *Trullula sacchari* Ell. and Ever., Jour. Inst. Jamaica 1:159. 1892. *Coniothyrium sacchari* (Mass.) Prill. and Delacr., Bull. Soc. Myc. France 13:113. 1897. Delacroix, Malad. Plant Cult. dans Pays Chauds, p. 528. 1911. *Microsphaeropsis bakeri* Syd., Ann. Myc. 14:369. 1916. Sacc., Syll. Fungorum 25:260. 1931. *Haplosporella melanconioides* Sacc., Atti dell'Accad. Ven.-Trent. Istrian. 10:73. 1917. Sacc., Syll. Fungorum 25:267. 1931. *Pleocyta sacchari* (Mass.) Petr. and Syd., Repert. Spec. Nov. Regni Veg. 42:455-6. 1927.

*Melanconiaceae.* Sporodochia subepidermal; conidiophores hyaline, 10-12 × 1.5-2 μ; conidia long, cirrhose, olive-brown, cylindrical, 9-14 × 2.7-3.5 μ. *Rind-disease.*

Andaman Islands, Antigua, Argentina, Barbados, Borneo, Brazil, British Guiana, Central America, China, Colombia, Cuba, Dominican Republic, Egypt, Fiji, Formosa, Guadeloupe, Hawaii, India, Indo-China, Jamaica, Java, Madagascar, Malaya, Martinique, Mauritius, Mexico, Nevis, New So. Wales, Paraguay, Peru, Philippine Islands, Portugal, Puerto Rico, Queensland, Reunion, St. Kitts, St. Lucia, St. Vincent, South China, Southern United States, Tahiti, Trinidad, Uganda, Union So. Africa. On *Saccharum spontaneum,* Philippine Islands, Siam.

Massee describes *Trichosphaeria sacchari* (Kew Bull. Misc. Infor. 1893:149 and Ann. Bot. 7:515, pl. XXVII, 1893) as the perfect stage, but his work has never been confirmed. Petrak and Sydow studied Massee's specimen and state "eine *Papularia-artige* Form ist." Massee's plate illustrates micro- and macroconidia (endogenous) of *Thielaviopsis.* Howard (Ann. Bot. 15:683-701. 1901) erroneously reports *Melanconium* and *Diplodia cacaoicola* as forms of the same fungus. *Microdiplodia melaspora* (q. v.) under one or another of its names has been commonly considered synonymous with this *Melanconium.*

*Melanconium saccharinum* Penz. and Sacc. See *Papularia vinosa* (Berk. and Curt.) Mason

Melanospora globosa Berl., Malpighia 5:409, pls. XXIX,, XXX. 1891. Sacc., Syll. Fungorum 11:356. 1895. Spegazzini, Rev. Fac. Agron. y Vet. 2:234. 1896.

*Hypocreaceae.* Perithecia superficial, globose-ovoid, 250-280 μ diam.; spores lemon-shaped, 18-21 × 16-17 μ. On dead leaves and culms. Argentina.

Meliola sp.

*Perisporiaceae.* All reports of *Meliola* spp. as sooty molds are more properly *Capnodium* or related forms. *Meliola capnodium* ex Cook, Cong. Int. Soc. Sugar Cane Tech. Proc. 4, Bull. 128:4, 1932, is apparently in the same category.

Meliola arundinis Pat., Jour. de Bot. 11:348. 1897. Sacc., Syll. Fungorum 14:473. 1899. Stevens, Ann. Myc. 26:182. 1928.

*Perisporiaceae.* Perithecia 150-200 μ diam.; setae erect, 3-4 branched at tip, about 200 μ tall; spores 4-septate, 40-55 × 20 μ; capitate hyphopodia alternate. Black, more or less circular, superficial areas on living leaves of *Saccharum* spp. China, India, Philippine Islands.

Meliola hercules v. Höh. Sitzber. K. Akad. Wiss. Wien Math. Natur. Kl. 118: 316. 1909. Sacc., Syll. Fungorum 22:57. 1913.

*Perisporiaceae.* On leaves. *S. spontaneum.* Java.

Meliola panici Earle, Muhlenbergia 1:12. 1901. Sacc., Syll. Fungorum 17: 550. 1905.

*Perisporiaceae.* On leaves. *S. spontaneum.* Philippine Islands.

Meliola sacchari Syd., Ann. Myc. 12:548. 1914. Sacc., Syll. Fungorum 24: 294. 1926. Stevens, Ann. Myc. 26:184. 1928.

*Perisporiaceae.* Perithecia 150-200 $\mu$ diam.; setae erect, irregularly 2-6 branched at tip, 175-400 $\mu$ tall; spores 4-septate, 40-48 $\times$ 14-18 $\mu$; hyphopodia opposite. Black, superficial, fungus patches on living leaves of *S. officinarum,* India and *S. spontaneum,* Philippine Islands. Stevens suggests "perhaps merely a variety of *M. arundinis* with somewhat longer setae."

Merulius byssoides Burt, Ann. Mo. Bot. Garden 4:358, pl. XXII (fig. 35). 1917. Sacc., Syll. Fungorum 23:462. 1925.

*Polyporaceae.* Hymenium dry, effused, dresden-brown, rugose-porose, pores shallow (2-4 per mm); spores even, deep olive-buff, 4.5-6 $\times$ 3.5-4.5 $\mu$. On cane trash and soil. Puerto Rico.

Metasphaeria saccharicola Speg., Ann. Mus. Nac. Buenos Aires (3) 10:376. 1909. Sacc., Syll. Fungorum 22:199-200. 1913.

*Sphaeriaceae.* Perithecia erumpent or superficial, 150-180 $\mu$ diam.; paraphyses filiform; spores elongate-fusoid, dilutely hyaline, 7-septate, 45-50 $\times$ 7-8 $\mu$. On rotten culms. Argentina.

Metasphaeria usteri Speg., Rev. Mus. LaPlata 15:23. 1908. Sacc., Syll. Fungorum 22:198-9. 1913.

*Sphaeriaceae.* Perithecia amphigenous, 90-120 $\mu$ diam.; spores hyaline, subfusiform, 5-septate, 20 $\times$ 4 $\mu$. Spots amphigenous on dying leaves, 10-30 $\times$ 2-4 mm. Argentina.

Microdiplodia melaspora (Berk.) Griff. and Maubl., Bull. Soc. Myc. France 25:55. 1909. Sacc., Syll. Fungorum 22:1006. 1913. *Darluca melaspora* Berk. *in* Cooke, Nuovo Giorn. Bot. Ital. 10:26. 1878. *Coniothyrium melasporum* (Berk.) Sacc., Syll. Fungorum 3:319. 1884. *Microdiplodia melaspora* (Berk.) Petr. and Syd., Ann. Myc. 22:341. 1924.

*Phomaceae.* Conidia 2-celled (rarely one), 6-10 $\times$ 4.5-6 $\mu$. On dead culms. Philippine Islands, Portugal, Puerto Rico (erroneously referred *in* Cooke's note to Queensland), Venezuela. This fungus has been generally referred to *Melanconium sacchari,* but Delacroix (Bull. Soc. Myc. Fr. 13:113, 1897) and Petrak and Sydow (Repert. Spec. Noc. Regni Veg. 42:455, 1927) studied the type and consider the two distinct. Chardon and Toro (Monog. Univ. P. Rico B 2:226, 1934) refer here a Venezuelan specimen, reporting, however, 1-celled conidia.

*Microsphaeropsis bakeri* Syd. See *Melanconium sacchari* Mass.

Microspira northii Carpenter and Bomonti. Hawaii. Planters' Rec. 25:179-180, pl. I. 1921.

*Spirillaceae.* Organism a straight to curved rod, variable, 2.5-8.0 $\times$ 0.75-1.5 $\mu$; motile with three to ten or more elongated, peritrichiate flagella; spores

ovoid, in middle of rods, 2-5 × 3.0 μ; gas liberating, non-gum forming; thermophilic, causing deterioration of hot juices in factory. Hawaii.

MICROTYPHA SACCHARICOLA Speg., Anal. Mus. Nac. Buenos Aires (3) 13:342. 1910. Sacc., Syll. Fungorum 22:1352. 1913.

*Dematiaceae.* Fertile hyphae gregarious, straight or subcircinate; conidia ellipsoid, smooth, rounded at both ends, 5-6 × 3-4 μ, borne in dense cylindrical masses (Typha-like). On rotten culms. Argentina.

MONASCUS PURPUREUS Went, Ann. Sci. Nat. (8) 1:1-18, illus. 1895. Sacc., Syll. Fungorum 14:825. 1899.

*Monascaceae.* Forming purple colonies; sporangia globose, 30-75 μ diam., polysporous; spores angular then spherical, purple, 5-6.5 μ diam.; conidia in short chains, globose, purple. On spoiled sugar. Louisiana.

MONILIA FUSCA Browne, Jour. Ind. Eng. Chem. 10:178-90. 1918. Guilliermond and Tanner, The Yeasts, p. 378, 2 figs. 1920.

*Moniliaceae.* Colonies greenish brown, otherwise as with *M. nigra.* On Cuban raw sugar.

MONILIA JAVANICA Went and Prin.-Geerligs, Arch. Java-Suikerindus. 2:542-43, pl. III (fig. 9). 1894. Sacc., Syll. Fungorum 11:589. 1895.

*Moniliaceae.* Hyphae forming bundles, budding freely at ends and on lateral branches; conidia ellipsoid, hyaline, 5-8 μ long. Concerned in production of alcoholic drink "arak" from final molasses. Java.

MONILIA NIGRA Browne, Jour. Ind. Eng. Chem. 10:178-90. 1918. Guilliermond and Tanner, The Yeasts, p. 376-7, 2 figs. 1920.

*Moniliaceae.* Colonies black; hyphae budding freely, composed of chains of cells, strongly constricted at septa. On Cuban raw sugar.

*Monilia sitophila* (Mont.) Sacc. See *Neurospora sitophila* Shear and Dodge.

MUCOR spp.

*Mucoraceae.* Undetermined species associated with root-rot (secondary), on cane trash, etc. Louisiana.

MYCORRHIZA

Ciferri (Phytopath. 18:249-61, 1928) reports a Phycomycetous endophyte in roots. Dominican Republic. Costantin (Ann. Sci. Nat. (Bot. Ser.) 10: 299-364. 1927) opines that Seréh (in Java) is due to absence of mycorrhizal fungi and loss of hereditary vigor.

MYCOSPHAERELLA

*Sphaerella* as a fungus name is a homonym of *Sphaerella,* an algal genus, hence species in the former genus have been or should be transferred to *Mycosphaerella.* To avoid making new combinations, however, in this publication, the four species on cane are treated under *Sphaerella.*

*Mycosphaerella striatiformans* Cobb See *Sphaerella striatiformans* (Cobb) Sacc. and Trott.

MYRIOGENOSPORA ACICULISPORAE Vizioli, Bol. Agric. São Paulo 27:60-69, 3 pls. 1926. Diehl, Phytopath. 24:677. 1934.

*Dothidiaceae.* Stromatic masses of hyphae on leaves (often binding unfolding leaves together) in which loculate perithecia appear, 250-380 × 200-300 μ,

delimited by a zone of dark tissue, ostiolate; asci fusiform, 210-250 × 12-16 μ, multispored; spores 18-25 × 1.5 μ. Argentina, Brazil.

Myrothecium verrucaria (Alb. and Schw.) Ditm. *in* Sturm, Deutsch.-Fl. 1:7. 1816. Sacc., Syll. Fungorum 4:750. 1886. Spegazzini, Rev. Fac. Agron. y Vet. 2:256. 1896.

*Tuberculariaceae.* Sporodochia black, subcircular, with white villose margins, 1-2 mm diam.; conidia ovate, olivaceous fuscous, 8-10 × 3-5 μ. On dead and dying leaf-sheaths. Argentina, Puerto Rico.

Naucoria sacchari Murrill, Mycologia 4:79. 1912. Sacc., Syll. Fungorum 23:272. 1925.

*Agaricaceae.* On dead roots. Jamaica.

Naucoria suborbicularis (Bull.) Fr., Hymen. Sueciae 1:376. 1857. Sacc., Syll. Fungorum 5:844. 1887.

*Agaricaceae.* On rotting trash. Argentina.

Nectria spp.

*Hypocreaceae.* Undetermined species on dead and dying canes. Brazil, Florida, Hawaii, Puerto Rico.

Nectria flavociliata Seaver, Mycologia 1:54, pl. V (fig. 11). 1909. Sacc., Syll. Fungorum 22:471. 1913.

*Hypocreaceae.* Perithecia gregarious, subglobose, clothed with golden or sulphur-yellow clavate hairs, 250-300 μ diam.; spores fusoid, 1-septate, hyaline, 8-12 × 2.5-3 μ. On dead stalks. Puerto Rico.

Nectria laurentiana Marchal, Bull. Soc. Belge de Microsc. 20:261, pl. VII (fig. 2). 1894. Sacc., Syll. Fungorum 11:358. 1895. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:213-14, pl. XXVII (figs. 21-23). 1917.

*Hypocreaceae.* Perithecia stromatic, rugose; asci 60-70 × 7-8 μ; spores 12-13 × 4-5 μ, with *Fusarium* conidial stage. On rotten stalks. Belgian Congo, Dominican Republic, Puerto Rico. Transferred by Seaver and Chardon (Sci. Survey P. Rico 8:42. 1926) to *Creonectria.*

Nectria saccharicola Speg., Rev. Fac. Agron. y Vet. 2:234. 1896. Sacc., Syll. Fungorum 14:634. 1899.

*Hypocreaceae.* Perithecia superficial, gregarious, dull yellow or ochraceous, 150-180 μ diam.; spores 10-12 × 3-4 μ. On rotten stalks. Argentina.

*Nematosporangium arrhenomanes* (Drechsler) Sideris The genus *Nematosporangium* (Schröter, 1893) appears synonymous with the genus *Pythium* (Pringsheim, 1858) since the latter likewise was erected on a nematoid or filamentous species. In view of the existence of forms having sporangia consisting in part of subspherical and part filamentous elements, the extension of the genus *Pythium* to include species with wholly subspherical sporangia appears in conformity with sound taxonomic usage (see Drechsler, Wash. Acad. Sci. 20:398-9. 1930). See *Pythium arrhenomanes* Drechsler.

*Nematosporangium arrhenomanes* (Drechsler) Sideris var. *hawaiiensis* Sideris See *Pythium arrhenomanes* Drechsler

*Nematosporangium epiphanosporon* Sideris See *Pythium arrhenomanes* Drechsler

*Nematosporangium hyphalosticton* Sideris See *Pythium arrhenomanes* Drechsler

*Nematosporangium leiohyphon* Sideris See *Pythium arrhenomanes* Drechsler

*Nematosporangium leucosticon* Sideris See *Pythium arrhenomanes* Drechsler

*Nematosporangium polyandron* Sideris See *Pythium arrhenomanes* Drechsler

*Nematosporangium rhizophthoron* Sideris See *Pythium arrhenomanes* Drechsler

*Nematosporangium spaniogamon* Sideris See *Pythium arrhenomanes* Drechsler

*Nematosporangium thysanohyphalon* Sideris See *Pythium arrhenomanes* Drechsler

Neurospora crassa Shear and Dodge, Jour. Agric. Res. 34:1026, illus. 1927. *Stat. conid.=Monilia crassa* Shear and Dodge, l. c.

*Hypocreaceae.* Pulvinate, then effuse and forming fluffy aerial masses, pale salmon to light orange; conidia catenulate, connected by narrow isthmi, globose to subglobose, smooth, yellow to pale orange in mass, 6-8 $\mu$ diam.; perithecia superficial, smooth, or loosely soft hairy, 400-600 $\mu$ diam.; ascospores elliptical, with about 20 longitudinal ridges, dark brown to black, 23-32 $\times$ 11-16 $\mu$. On bagasse. Louisiana.

Neurospora sitophila Shear and Dodge, Jour. Agric. Res. 34:1026, 4 pls. 1927. *Stat. conid.=Monilia sitophila* (Mont.) Sacc., Michelia 2:359. 1882. Sacc., Syll. Fungorum 4:35. 1886. Johnston and Stevenson, Jour. Dept. Agric. P. Rico. 1:222. 1917.

*Hypocreaceae.* Pulvinate fluffy masses, pale salmon to orange; conidia catenulate, connected by narrow isthmi, globose to subglobose, 10-12 $\mu$ diam.; perithecia superficial, smooth, brown to black, subcoriaceous, 200-300 $\mu$ diam.; ascospores elliptical, olivaceous to dark greenish-black, 16-17 ribbed, 20-26 $\times$ 10-15 $\mu$. On burnt cane in fields, on bagasse and press-cake piles, etc. Hawaii, Louisiana, Puerto Rico.

Nigrospora sp.

*Dematiaceae.* An undetermined species associated saprophytically with ring spot lesions. Florida.

Nigrospora oryzae (Berk. and Br.) Petch, Jour. Indian Bot. Soc. 4:21-24. 1924. Mason, Trans. Brit. Myc. Soc. 12:156. 1927. Sacc., Syll. Fungorum 25:775. 1931. *Nigrospora panici* Zimm., Centralbl. f. Bakt. Abt. II, 8:220. 1902. Sacc., Syll. Fungorum 18:571. 1906. *Basisporium gallarum* Moll., Bull. Soc. Myc. Fr. 18:170, 1 pl. 1902. Sacc., Syll. Fungorum 18:533. 1906.

*Dematiaceae.* Conidiophores inflated (ampulliform or "jar-shaped"); conidia borne singly, black, opaque, round from top view, flattened in side view, about 14 $\mu$ diam. Forming black sooty areas on dead and dying leaves, leaf-sheaths and stalks, also commonly at nodes of sound canes. Barbados, Hawaii, Java, Puerto Rico.

Bremer (Meded. Proefsta. Java Suikerind. 22:885-96. 1926) uses the binomial *N. panici* for a form isolated from spots on leaf-sheaths in Java. From the conidial size given (14-18 $\times$ 11-16 $\mu$) it is not clear to just which of the

three species recognized by Mason (l. c.) this form should be assigned. Bremer also states that his fungus appeared to be a form of *Melanconium sacchari* Mass. His evidence is inadequate.

*Nigrospora panici* Zimm. See *Nigrospora oryzae* (Berk. and Br.) Petch

Nigrospora sacchari (Speg.) Mason, Trans. Brit. Myc. Soc. 12:161. 1927. *Glenospora sacchari* Speg., Rev. Fac. Agron. y Vet. 2:249. 1896. Sacc., Syll. Fungorum 14:1074. 1899.

*Dematiaceae.* Differs from *N. oryzae* in the larger conidia (20-22 $\mu$ in largest diameter). On dying leaves and culms. Argentina.

Nigrospora sphaerica (Sacc.) Mason, Trans. Brit. Myc. Soc. 12:158. 1927. Sacc., Syll. Fungorum 25:775-6. 1931. *Epicoccum levisporum* Pat., Bull. Soc. Myc. Fr. 9:164. 1893. Sacc., Syll. Fungorum 11:655. 1895. *Coniosporium extremorum* Syd., Ann. Myc. 11:270. 1913. Sacc., Syll. Fungorum 25:754. 1931.

*Dematiaceae.* Differs from *N. oryzae* in size of conidia only (16-18 $\mu$). On dead and dying leaves, leaf-sheaths, and canes. Ecuador, Gold Coast, Philippine Islands, Uganda.

Northiella sacchari Lyon, Exp. Sta. Hawaii. Planters' Assoc. (Bot. Ser.) Bull. 3, pt. I:41. 1921. A temporary name applied to organism-like, intracellular bodies in Fiji-disease galls, since classified as a transmissible virus disease (Mungomery and Bell, Queensland Bur. Sugar Exp. Sta's, Div. Path. Bull. 4. 1933. Ocfemia, Amer. Jour. Bot. 21:113-20. 1934. See *Phytamoeba sacchari* McWhorter

Odontia

*Hydnaceae.* Undetermined species as saprophytes on cane trash and associated with root rot reported from Cuba, Puerto Rico, Trinidad.

Odontia sacchari Burt, Ann. Mo. Bot. Garden 4:233-4, fig. 1. 1917. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:217, pl. XXVI (figs. 11-12). 1917. Sacc., Syll. Fungorum 23:485. 1925.

*Hydnaceae.* Fructifications resupinate, effused, white to ivory yellow; granules about 8 per mm; cystidia incrusted, hyaline, protruding 60-90 $\mu$; spores hyaline, smooth, subglobose, 3.75 $\times$ 3-3.75 $\mu$. On dead leaf-sheaths. Cuba, Puerto Rico, Trinidad. Cuban specimens referred to *Peniophora* sp. and *Hypochnus sacchari* Speg. belong here per Dr. Burt.

Odontia saccharicola Burt, Ann. Mo. Bot. Garden 4:235-6, fig. 2. 1917. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:189, pl. XIX (fig. 1). 1917. Sacc., Syll. Fungorum 23:486. 1925.

*Hydnaceae.* Fructifications resupinate, effused, very thin, whitish; granules 6-9 per mm; cystidia hair-like, flexuous, not incrusted, 8-18 $\mu$ long; stellate crystals interhyphal, 4.5-5.7 $\mu$ diam.; spores hyaline, smooth, 5.5 $\times$ 2.5 $\mu$. Rotting and binding firmly together lower leaf-sheaths. *Himantia stellifera* is possibly a sterile form of this species. British Guiana, Cuba, Dominican Republic, Hawaii, Lesser Antilles, Puerto Rico, Trinidad, Union So. Africa.

Oedocephalum sp.

*Moniliaceae.* An undetermined species associated saprophytically with diseased roots. Louisiana.

Oedocephalum bergii Speg., Rev. Fac. Agron. y Vet. 2:244. 1896. Sacc., Syll. Fungorum 14:1042. 1899.

*Moniliaceae.* Conidia hyaline, 10-20 × 6-10 μ. A white mold on dead leaves and culms. Argentina.

Olpidium sacchari Cook, Jour. Agric. Univ. P. Rico 19:127, 6 pls. 1935.

*Chrytridiaceae.* Sporangia usually solitary in cells of host, multinucleate, germinating by single tube; zoospores numerous, uninucleate, amoeboid; resting spores spherical and thick-walled. In diseased roots. Puerto Rico.

Oospora sp.

*Moniliaceae.* An undetermined saprophytic species associated with root rot. Louisiana.

Oospora tomentella Speg., Rev. Fac. Agron. y Vet. 2:243. 1896. Sacc., Syll. Fungorum 14:1039. 1899.

*Moniliaceae.* Conidia hyaline, catenulate, globose or ellipsoid, 1.9-2 μ. On rotting cane spindles. Argentina.

*Ophiobolus stenospilus* Carpenter See *Cochliobolus stenospilus* (Carpenter) Matsumoto and Yamamoto

Ophiognomonia sacchari Speg., Rev. Fac. Agron. y Vet. 2:231. 1896. Sacc., Syll. Fungorum 14:613-14. 1899.

*Sphaeriaceae.* Perithecia amphigenous, globose, 150 μ diam.; spores hyaline, 1-celled, cylindrical, 70-80 × 5 μ. On dying lower leaves. Argentina. This genus is usually considered synonymous with *Linospora.*

Otthia sp.

*Sphaeriaceae.* Averna Sacca (Bol. Agric. São Paulo 17:626-8, 1 fig. 1916) reports an undetermined species on dead canes. Brazil.

Ozonium sacchari Speg., Rev. Fac. Agron. y Vet. 2:257. 1896. Sacc., Syll. Fungorum 14:1188. 1899.

*Mycelia sterilia.* Sterile mycelium on dead leaf-sheaths. Argentina.

Paecilomyces varioti Bainier, Bull. Soc. Myc. Fr. 23:26, pl. VII. 1907. Sacc., Syll. Fungorum 22:1273. 1913. Thom, The Penicillii, p. 544. 1930. *Penicillium divaricatum* Thom, U. S. Dept. Agric. Bur. Animal Ind. Bull. 118:72-73, fig. 29. 1910.

*Moniliaceae.* Cultures yellowish-brown; fructifications terminal or on short branches from creeping hyphae; conidia long catenulate, elliptical or fusiform, yellowish to brownish, 5-7 × 2.5-3 μ. On sugar. Union So. Africa. The genus considered a synonym of *Penicillium* by Clements and Shear, Genera of Fungi, p. 388. 1931.

*Papularia arundinis* (Cda.) Fr. See *Coniosporium arundinis* (Cda.) Sacc.

*Papularia saccharina* (Penz. and Sacc.) v. Hoeh. See *Papularia vinosa* (Berk. and Curt.) Mason

Papularia vinosa (Berk. and Curt.) Mason, Annotated Account of Fungi Received at the Imp. Myc. Inst. List II (Fasc. 2), p. 21. 1933. *Gymnosporium vinosum* Berk. and Curt., Jour. Linn. Soc. Bot. 10:355. 1869. *Coniosporium vinosum* (Berk. and Curt.) Sacc., Syll. Fungorum 4:244. 1886. *Melanconium saccharinum* Penz. and Sacc., Malpighia 15:238. 1901. Penz. and Sacc., Icones Fung. Javan. 97, pl. LXV (fig. 3). 1904. Sacc., Syll. Fungorum 18:471. 1906. *Papularia saccharina* (Penz. and Sacc.) v. Hoeh., Fragm. z. Mykol. No. 1184. 1919. *Melanconium lineolatum* Sacc., Atti. Ven.-Trent. Sci. Nat. 10:83. 1917. Sacc., Syll. Fungorum 25:582. 1917.

*Melanconiaceae.* Sporodochia linear, erumpent, black; conidia black, smooth, lenticular, often distorted, 18-26 $\mu$ diam., up to 14 $\mu$ in breadth, on phialide-like sporophores, occasionally loosely aggregated in heads. On dead and dying leaves and culms, particularly along midribs. Ceylon, Cuba, Louisiana, Philippine Islands, Puerto Rico, Uganda.

Penicillium spp. (including *Citromyces).*

*Moniliaceae.* Undetermined species associated with root rot or foot rot, on cane trash, and as agents of sugar deterioration. Hawaii, Java, Louisiana, and doubtless all other cane regions. Thom (The Penicillii, p. 133. 1930) notes "studies tend to eliminate the Penicillia from any significant role in sugar deterioration."

*Penicillium divaricatum* Thom See *Paecilomyces varioti* Bainier

Penicillium expansum (Link) emend. Thom, U. S. Dept. Agric. Bur. Animal Ind. Bull. 118:27-28, 1 fig. 1910. Thom, The Penicillii, p. 402, 1 fig. 1930.

*Moniliaceae.* Colonies green to gray-green, finally brown; conidiophores grouped to form coremia; conidia elliptical to globose, green, catenulate, 3-3.4 $\mu$. On sugar. Louisiana.

Penicillium glaucum Link, Obs. Myc. 1:15. 1809. Sacc., Syll. Fungorum 4:78. 1886.

*Moniliaceae.* Reported as an agent of sugar deterioration and on dead cane (?). Hawaii, Java, Louisiana. Thom (The Penicillii, pp. 560-1. 1930) states that the species was originally inadequately described, has been used as a dumping ground for a variety of forms, and being now undeterminable should be deleted.

Penicillium luteum Zukal, Sitzber. K. Akad. Wiss. (Vienna) Math. Naturw. Kl. 98:521. 1888. Sacc., Syll. Fungorum 11:593. 1895. Thom, The Penicillii, p. 448. 1930.

*Moniliaceae.* Conidia ellipsoid, gray-green, smooth, 2.3 $\times$ 1.4 $\mu$; ascospores, transversely tricostate, 4.8 $\times$ 3.3 $\mu$. On spoiling sugar. Java, Louisiana.

Penicillium pfefferianum (Wehmer) Pollacci, Atti. Inst. Bot. Univ. Pavia Ser. II, 16:121-36, pl. XVI. 1916. Thom, The Penicillii, p. 186. 1930. *Citromyces pfefferianus* Wehmer, Beitr. z. Kenntn. einheim. Pilze 1:22-24, pl. I (figs. 1-13). 1893. Sacc., Syll. Fungorum 14:1048. 1899.

*Moniliaceae.* Colonies greenish to gray; conidiophores simple or branched, scarcely or rarely septate, 70 $\times$ 3 $\mu$; conidia globose, long catenulate, green to gray, 2.5-3 $\mu$. In sugar solutions. Germany.

Penicillium platense Speg., Rev. Fac. Agron. y Vet. 2:246-7. 1896. Sacc., Syll. Fungorum 14:1047-48. 1899. Thom, The Penicillii, p. 196. 1930.

*Moniliaceae.* Colonies glaucous green; conidia long, catenulate, smooth, pale green, 2-2.5 $\mu$ diam. On rotten leaves. Argentina.

Penicillium purpurogenum Stoll, Beitr. zu Morph. u. Biol. Char. Penicillium, p. 32, pls. I (fig. 6), III (fig. 2). 1904. Sacc., Syll. Fungorum 18:520. 1906. Thom, U. S. Dept. Agric. Bur. Animal Ind. Bull. 118:36, fig. 5. 1910. Thom, The Penicillii, p. 478. 1930.

*Moniliaceae.* Colonies green, conidiophores 100-300 $\times$ 3-3.5 $\mu$; conidia 3.4-3.8 $\times$ 2-2.5 $\mu$. On sugar. Louisiana.

*Penicillium roseum* Link See *Gliocladium roseum* (Link) Bainier

Penicillium rubrum Stoll, Beitr. z. Morph. u. Biol. Char. Penicillium, p. 35, pls. I (fig. 7), III (fig. 3). 1904. Sacc., Syll. Fungorum 18:520. 1906. Thom, The Penicillii, p. 476. 1930.

*Moniliaceae.* Conidia elliptical, yellow to dark green, 3.4 $\times$ 2 $\mu$. On spoiling sugar. Java.

Penicillium sacchari J. Ray, Rev. Gen. Bot. 9:294-300, pl. 16 (figs. 23-27). 1897. Sacc., Syll. Fungorum 22:1276. 1913. Thom, The Penicillii, p. 452. 1930.

*Moniliaceae.* Mycelial masses yellow to orange; conidia green, 2 $\times$ 1 $\mu$; asci 6-spored, imbedded in the mycelium; ascospores thick walled, 3 $\times$ 2.5 $\mu$. On rotten culms. Martinique.

Peniophora spp.

*Thelephoraceae.* Undetermined species on dead canes. Puerto Rico. Cuban report=*Odontia sacchari* (q. v.).

Peniophora cinerea (Pers.) Cke., Grevillea 8:20, pl. 123 (fig. 8). 1880. Sacc., Syll. Fungorum 6:643. 1888. Burt, Ann. Mo. Bot. Garden 12:348. 1925.

*Thelephoraceae.* Effused, thin, closely adnate, ashen colored, cracking in drying; cystidia incrusted, 25-40 $\times$ 4.5-9 $\mu$; spores smooth, cylindrical, 6-9 $\times$ 2-3 $\mu$. On dead canes. Puerto Rico.

Peniophora flavido-alba Cke., Grevillea 8:21, pl. 125 (fig. 14). 1879. Sacc., Syll. Fungorum 6:644. 1888. Burt, Ann. Mo. Bot. Garden 12:248. 1925.

*Thelephoraceae.* Fructifications broadly effused, 5-15 cm long, thin, cartridge buff to pinkish buff; cystidia incrusted, sharp pointed, 60-120 $\mu$ long; spores hyaline, smooth, 4.5-6 $\times$ 2.5-3.5 $\mu$. On cane trash. Puerto Rico.

Periconia atra Cda., Icones Fung. 1:19, fig. 258. 1837. Sacc., Syll. Fungorum 4:271. 1886.

*Dematiaceae.* Conidia globose, brown. On dead cane leaves. St. Croix.

Periconia sacchari Johnston, Jour. Dept. Agric. P. Rico 1:225, pl. XXIX (figs. 16-18). 1917. Sacc., Syll. Fungorum 25:769. 1931.

*Dematiaceae.* Fertile hyphae erect, brown, short branched, 200-300 $\mu$; conidia ovoid or elliptical, cylindrical when mature, brown, tuberculate, 22-24 $\times$ 11 $\mu$. On dead and dying cane leaves. Cuba, Puerto Rico.

Pestalozzia fuscescens Sor. var. sacchari Wakker *in* Wakker and Went, Ziekten Suikerriet op Java, pp. 162-6, col. pl. XVIII (figs. 1-8). 1898.

*Melanconiaceae.* Conidia 5-celled, with 4-setae, 32-38 × 14-16 μ. Irregular ashen leaf spots with brown borders. On living leaves. Cuba, India, Java, Mauritius, Philippine Islands, Queensland.

Phaeonectria sacchari da Camara, Anais do Inst. Sup. de Agron. 3:80, figs. 20-23. 1930. (Preprint, p. 30. 1929.)

*Hypocreaceae.* Perithecia solitary or gregarious, subglobose, 260-340 μ diam.; spores oblong-ellipsoid, 1-septate, constricted at septum, upper cell longer and more attenuate, lower globose, brown, 15-18 × 4.5-5 μ. On dead culms. Portugal.

*Phaeoporus luteoumbrinus* Rom. See *Polyporus luteo-umbrinus* (Rom.) Sacc.

*Phallus celebicus* P. Henn. See *Ithyphallus rubicundus* (Bosc) Fischer

*Phallus multicolor* (Berk. and Br.) Lloyd See *Dictyophora multicolor* Berk. and Br.

*Phallus rubicundus* (Bosc) Fr. See *Ithyphallus rubicundus* (Bosc) Fischer

Phoma sp.

*Phomaceae.* An unnamed saprophytic species associated with root rot. Louisiana.

Phoma bambusina Speg. *in* Bailey, Bot. Bull. Queensland Dept. Agric. 1894, p. 37, 1894 and Report Queensland Dept. Agric. 1894-5, p. 36. 1895.

*Phomaceae.* On stalks of seedlings. Queensland. No further details found. It is noted that McAlpine (Systematic Arrangement Austr. Fungi, p. 170. 1895) soon after Bailey's report was made lists *Phoma sacchari* (q. v.) but not *Ph. bambusina.*

Phoma heterospora Speg., Rev. Fac. Agron. y Vet. 2:239. 1896. Sacc., Syll. Fungorum 14:887. 1899.

*Phomaceae.* Pycnidia in pale, wide-spreading spots; conidia dimorphic, one elliptical-subglobose, 10-12 × 6-8 μ; the second fusoid, much smaller. On leaves and spindles killed by freezing. Argentina. Spegazzini suggests that this is a pycnidial stage of *Sphaerella sacchari.*

Phoma insidiosa Tassi, Bull. Lab. Bot. della R. Univ. Siena 1:8, pl. IX (fig. 8). 1897. Sacc., Syll. Fungorum 14:887-8. 1899.

*Phomaceae.* On cane leaves through inoculation. Kock and Rumbold, Phytopath. 11:259. 1921.

*Phoma sacchari* (Cke.) Sacc. See *Macrophoma sacchari* (Cke.) Berl. and Vogl.

Phoma sacchari Gutner, Acta Insti. Bot. Acad. Scientiarum U. S. S. R., Ser. II (Fasc. III), p. 789. 1936.

*Phomaceae.* Pycnidia numerous, semiglobose, 200-230 μ diam.; conidiophores bacillar; conidia cylindrical or elongate ellipsoid, both ends obtuse, 4-8 × 2.8 μ. On dying leaves in greenhouses. U. S. S. R.

Phoma saccharina Syd., Ann. Myc. 14:187. 1916. Sacc., Syll. Fungorum 25:95. 1931.

*Phomaceae.* Pycnidia lenticular to elliptical, dark brown, 50-80 μ diam.; conidia globose to ovate-globose, 1-celled, hyaline, 2.5-3.5 μ. On culms. India.

*Phyllachora cyperi* Rehm var. *donacis* Berl. and F. Sacc. See *Phyllachora sacchari-spontanei* Syd.

Phyllachora sacchari P. Henn., Hedw. 41:143. 1902. Sacc., Syll. Fungorum 17:839-40. 1905. Theissen and Sydow, Ann. Myc. 13:459. 1915.

*Dothidiaceae.* Stromata epiphyllous, black, 1-1.5 mm long, paraphysate; spores elliptical, obtuse at ends, hyaline, 16-20 × 9-10 μ. On living leaves. *Black leaf-spot.*

Argentina, India, Java, Philippine Islands. The report of this species on *S. spontaneum* in India should possibly be referred to *Ph. sacchari-spontanei.*

Phyllachora sacchari-aegyptiaci Br. and Cav., I Fungi Parassiti delle Piante Colti. od Utili, n. 416. 1909. Sacc., Syll. Fungorum 22:423. 1913.

*Dothidiaceae.* Stromata oblong, arranged in rows, confluent; paraphyses filiform; spores ellipsoid or ovoid, yellowish, smooth, 19-20 × 7.5-9.5 μ. On leaves of *Saccharum aegyptiacum (S. spontaneum).* Sicily.

Phyllachora sacchari-spontanei Syd., Phil. Jour. Sci. 8:279. 1913. Theissen and Sydow, Ann. Myc. 13:459. 1915. Sacc., Syll. Fungorum 24:586. 1926.

*Dothidiaceae.* Stromata on yellow or reddish-violet spots, .5-1.75 mm long, paraphysate; spores 1-celled, hyaline, 22-25 × 7.5-8.5 μ; conidia filiform, hyaline, straight or curved, 16-22 × 1 μ. On living leaves of *Saccharum spontaneum.* China, India, Philippine Islands. A specimen from India referred to *Ph. cyperi donacis* Berl. and F. Sacc. (Ann. Myc. 9:399. 1911) was afterwards transferred to *Ph. sacchari-spontanei.*

Phyllosticta sp.

*Phomaceae.* An undetermined species on leaves. Brazil.

Phyllosticta hawaiiensis Caum, Hawaii. Planters' Rec. 20:278. 1919. Caum, Exp. Sta. Hawaii. Sugar Plant. Assoc. (Bot. Ser.) Bull. 3:81, figs. 1-4. 1921. Sacc., Syll. Fungorum 25:43. 1931.

*Phomaceae.* Pycnidia erumpent, globose, 30-168 μ, on definite, dry, straw-colored spots with dark red to purple margins; conidia elliptical, hyaline, smooth, 2-3 vacuolate, 3.2-6.5 × 1.3-2.8 μ. Parasitic at base of leaf-sheaths and on rind beneath. Hawaii. Bourne (Fla. Agr. Exp. Sta. Bull. 267:28-31, 1934) considers this species a synonym of *Phyllosticta sorghina* Sacc.

Phyllosticta sacchari Speg., Rev. Fac. Agron. y Vet. 2:239. 1896. Sacc., Syll. Fungorum 14:864. 1899. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:220, pl. XXIV (fig. 4). 1917.

*Phomaceae.* Pycnidia 90-100 μ diam.; in definite, ashen, linear spots, 1-25 cm long, 1-10 mm wide, amphigenous, purple bordered; conidia ellipsoid, hyaline, 4-6 × 2-3 μ. On living leaves. Argentina, Brazil, Paraguay, Philippine Islands, Puerto Rico. The Puerto Rican fungus is reported with conidia 12-16 × 2.5-4 μ, suggesting that it is distinct from Spegazzini's species. Bourne (l. c.) considers *P. sacchari* Speg. a synonym of *Phyllosticta sorghina* Sacc.

PHYLLOSTICTA SACCHARICOLA P. Henn., Flora du Bas et Moyen Congo 2:105. 1907. Sacc., Syll. Fungorum 22:863. 1913.

*Phomaceae.* Spots amphigenous, oblong, ashen with fuscous or reddish margins; pycnidia hypophyllous, 60-90 $\mu$ diam.; conidia oblong to subfusoid, hyaline, 10-30 $\times$ 3.3-5 $\mu$. On living leaves. Belgian Congo. Bourne (l. c.) considers this species a pycnidial stage of *Leptosphaeria sacchari.*

PHYLLOSTICTA SORGHINA Sacc., Mich. Comm. Mycol. 1:140. 1879. Sacc., Syll. Fungorum 3:61. 1884. Possible synonyms *P. hawaiiensis* Caum and *P. sacchari* Speg. Bourne, Fla. Agric. Exp. Sta. Bull. 267, illus. 1934.

*Phomaceae.* Pycnidia 44-147 $\mu$ in diam.; conidia 3.4-6.7 $\times$ 1.7-3.4 $\mu$. Saprophytic on leaf, leaf-sheath, and stem as a secondary invader to *Helminthosporium ocellum* Faris and "changing eye spot lesions to ring spots" (Bourne). Florida, Puerto Rico.

PHYSALOSPORA EUCRYPTA Petrak, Ann. Myc. 21:312-13. 1923.

*Sphaeriaceae.* Perithecia immersed, paraphysate; spores long ellipsoid, hyaline, 1-celled, 11-14 $\times$ 4.5-6 $\mu$. On dead leaves. Philippine Islands.

PHYSALOSPORA PARAGUAYA Speg., Anal. Soc. Cient. Argentina 18:266. 1884. Sacc., Syll. Fungorum 9:598. 1891. (As *P. paraguaxa.)*

*Sphaeriaceae.* Perithecia erumpent, globose, black, glabrous, 150-180 $\mu$ diam., paraphysate; spores elliptical, rounded at the ends, hyaline, 5-8 $\times$ 2.5 $\mu$. On rotten canes. Brazil.

PHYSALOSPORA RHODINA (Berk. and Curt.) Cke., Grevillea 17:92. 1889. Sacc., Syll. Fungorum 9:592. 1891. Stevens, Mycologia 18:212. 1926. *Botryodiplodia theobromae* Pat., Bull. Soc. Myc. Fr. 8:136. 1892. Sacc., Syll. Fungorum 11:522. 1895. Butler, Fungi and Disease in Plants, pp. 385-7. 1918. *Diplodia cacaoicola* P. Henn., Engl. Bot. Jahrb. 22:80. 1895. Sacc., Syll. Fungorum 14:931. 1899. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:220-1, pls. XXI (fig. 1), XXXI (figs. 8-10). 1917. *Lasiodoplodia theobromae* (Pat.) Griff. and Maubl., Bull. Soc. Myc. Fr. 25:57. 1909. Sacc., Syll. Fungorum 22:1011. 1913. *Thyridaria tarda* Bancroft, Dept. Agric. Fed. Malay States Bull. 9:26. 1911. Sacc., Syll. Fungorum 24:770. 1928.

*Sphaeriaceae.* Pycnidia scattered, innate-erumpent, black; conidia ellipsoid, oblong, or subovoid, 1-septate, obtuse at both ends, deep brown to black, faintly striate, 18-22 $\times$ 10-14 $\mu$; perithecia gregarious, black, 250-300 $\mu$ diam.; spores hyaline, 24-42 $\times$ 7-17 $\mu$. *Dry rot.*

Alabama, Barbados, Brazil, British Guiana, British W. Indies, Cameroons, Ceylon, Cuba, Dominican Republic, India, Indo-China, Java, Malay States, Philippine Islands, Puerto Rico, Samoa, St. Thomé, Trinidad, "Tropical American in general." Bancroft (l. c.) described *Thyridaria tarda* as the perfect stage of the cane *Diplodia,* but carried out no cultural work to prove a connection. He also mentions an associated *Cytospora* stage.

PHYSALOSPORA SACCHARI (Berk. and Br.) Sacc., Syll. Fungorum 9:599. 1891.

*Sphaeriaceae.* Spores oblong, 1-celled, hyaline, 3-7 $\mu$ long. On leaves. Queensland.

Physalospora tucumanensis Speg., Rev. Fac. Agron. y Vet. 2:228. 1896. Sacc., Syll. Fungorum 14:523. 1899.

*Sphaeriaceae.* Perithecia 110-130 $\mu$ diam., in rows between leaf veins, erumpent; spores 1-celled, hyaline, smooth, obtuse at both ends, 18-22 $\times$ 8-10 $\mu$. On old and dying leaves. Argentina, Puerto Rico.

Physarum cinereum (Batsch) Pers. *in* Roemer, N. Mag. Bot. 1:89. 1794. Sacc., Syll. Fungorum 7:344. 1888. Macbride and Martin, The Myxomycetes, pp. 45-46, pl. III (figs. 45, 46). 1934.

*Physaraceae.* Sporangia sessile, subglobose to elongate, lilaceous gray; spore mass purplish-brown; spores warted, 7-11 $\mu$ diam. On cane trash, at times fruiting on living parts. Puerto Rico.

Physarum compressum Alb. and Schw., Consp. Fung., p. 97. 1805. Sacc., Syll. Fungorum 7:337. 1888. Macbride and Martin, The Myxomycetes, p. 74, pl. V (figs. 93-95). 1934.

*Physaraceae.* Sporangia compressed-globose, stipitate or sessile, white or ashen, calcareous; spores purplish-brown, warted, 10-12.5 $\mu$ diam. On cane trash. Argentina, Puerto Rico.

Physarum didermoides (Ach.) Rost. Monog., p. 97. 1875. Sacc., Syll. Fungorum 7:338. 1888. Macbride and Martin, The Myxomycetes, p. 70, pl. V (figs. 88, 89). 1934.

*Physaraceae.* Sporangia crowded, ovoid or cylindrical, stipitate or sessile, blue-gray, often capped with white, .4-.6 mm broad; spores black in mass, densely spinulose, 12-15 $\mu$ diam. Reported on cane trash by Caum. No other record found.

Physarum globuliferum (Bull.) Pers., Syn. Meth. Fung., p. 175. 1801. Sacc., Syll. Fungorum 7:339. 1888. Macbride and Martin, The Myxomycetes, pp. 63-4, pl. V (figs. 76-78). 1934.

*Physaraceae.* Sporangia stipitate, globose, about 5 mm diam., pale blue-gray to white; stipe calcareous, brittle, white to yellow; spore mass brown; spores violet, minutely warted, 7.5-9 $\mu$. Reported on *Saccharum* by Caum, but not by Saccardo.

*Physarum nodulosum* Cke. and Balf. See *Physarum pusillum* (Berk. and Curt.) Lister

Physarum pusillum (Berk. and Curt.) Lister, Mycetozoa, ed. 2, p. 64. 1911. Macbride and Martin, The Myxomycetes, p. 80, pl. VI (figs. 105-6). 1934. *Physarum nodulosum* Cke. and Balf. *in* Rav., N. Amer. Fung. Exsic. 479. 1881. (Nomen nudum.)

*Physaraceae.* Sporangia gregarious, stipitate, globose, grayish-white, then white, with brown base, .4-.6 mm diam.; stipe slender, longer than sporangia; spores black in mass, minutely warted, 10-12 $\mu$. diam. On dead material, fruiting on living leaf-sheaths. Puerto Rico.

Physarum tucumanensis Speg., Rev. Fac. Agron. y Vet. 2:237. 1896. Sacc., Syll. Fungorum 14:831. 1899.

*Physaraceae.* Sporangia globose, 300-500 $\mu$ diam.; spores smooth, globose, 9-10 $\mu$ diam. The species not recognized by Macbride and Martin; doubt-

fully referred to *Physarum melleum* Mass., Monogr., p. 278, 1892, by Lister (3rd ed., p. 25).

PHYTAMOEBA SACCHARI McWhorter, Phil. Agric. 11:110, 2 pls. 1922.

A name applied to certain intercellular parasitic amoeba occurring in cane material infected with Fiji disease. See also *Northiella sacchari* Lyon

*Phytomonas rubrilineans* Lee, Purdy, Barnum and Martin See *Bacterium rubrilineans* (Lee, Purdy, Barnum and Martin) Elliott

*Phytomonas rubrisubalbicans* Christopher and Edgerton See under *Bacterium*

*Phytomonas vascularum* (Cobb) Bergey et al. See *Bacterium vasculorum* (Cobb) Migula

PLASMODIOPHORA VASCULARUM Matz, Jour. Dept. Agric. P. Rico 4:41-46, 3 figs. 1920. Loc. cit. 6(3):28-47, 6 figs. 1922. Sacc., Syll. Fungorum 25:12. 1931 (as *P. vasculorum*). *Ligniera vascularum* (Matz) Cook, Jour. Dept. Agric. P. Rico 13:19-29, 4 pls. 1929. Loc. cit. 21:85-97, 3 pls. 1937. *Amoebosporus saccharinum* Cook, Jour. Dept. Agric. P. Rico 16:416, pl. LV (figs. 9-16). 1932. *Amoebosporus vascularum* Cook, loc. cit. 16:415, pls. LIII, LIV. 1932.

*Plasmodiophoraceae.* Plasmodium yellow, granular; resting spores in tracheal tubes, granular, orange, yellow or slightly brownish, with thick hyaline walls, 14-16 $\mu$ diam.; zoospores pyriform, uniflagellate, amoeboid. The organism occurs in the vascular tissues of the lower portion of the stalks, clogging the fibers which are colored orange, yellow, or red. Affected canes dry out, wilt, and die. Barbados, Puerto Rico, Venezuela.

*Dry top rot.*

PLECTOSPIRA GEMMIFERA Drechsler, Jour. Agric. Res. 38:358, 3 pls. 1929. Rands and Dopp, U. S. Dept. Agr. Tech. Bull. 666 (in press). 1938.

*Saprolegniaceae.* Oospores, 21.9 $\mu$ average diam.; gemmae in grape-like clusters. Isolated from cane roots, but saprophytic. Louisiana.

*Pleocyta sacchari* (Mass.) Petr. and Syd. See *Melanconium sacchari* Mass.

PLEOSPORA INFECTORIA Fckl. var. SACCHARI Speg., Rev. Fac. Agron. y Vet. 2:233. 1896. Sacc., Syll. Fungorum 14:600-1. 1899.

*Sphaeriaceae.* Perithecia in rows, globose, membranaceous, 150-160 $\mu$, nonparaphysate; spores elliptical, muriform, smooth, yellow-brown. On dead leaves. Argentina.

POLYDESMUS sp.

*Dematiaceae.* An undetermined species on dead leaves. Puerto Rico.

POLYPORUS LUTEO-UMBRINUS (Rom.) Sacc., Syll. Fungorum 16:149. 1902. *Phaeoporus luteoumbrinus* Rom., K. Svenska Vet.-Akad. Handl. 26:27, pl. III (fig. 45). 1901.

*Polyporaceae.* Sporophores conchate, substipitate, zonate, ferruginous-umbrinous; hyphae 2-4.5 $\mu$ diam.; cystidia none; pores 6-9 per mm; spores umbrinous, globose-ellipsoid, 4.5-5 $\times$ 3.5-4 $\mu$. Weak parasite on old stools. Argentina.

*Polyporus nivosus* Berk. See *Trametes nivosa* (Berk.) Murr.

Polyporus occidentalis Klotzsch, Linnaea 8:486. 1833. *Polystictus occidentalis* (Klotzsch) Cke., Grevillea 14:85. 1886. Sacc., Syll. Fungorum 6:274. 1888. *Coriolopsis occidentalis* (Klotzsch) Murr., Bull. Torr. Bot. Club 32:358. 1905.

*Polyporaceae.* Pileus corky, applanate, zonate, tomentose, gray-ochraceous to grayish isabelline; context 1-6 mm thick; pores 2-4 per mm, isabelline; spores allantoid, smooth, hyaline, 5-7 × 2-3 μ. Puerto Rico.

Polyporus sanguineus (L.) Meyer, Flor. Esseq., p. 304. 1818. Fries, Epicr. Myc., p. 444. 1838. *Polystictus sanguineus* (L.) Fr., Nov. Symb., p. 75. 1851. Sacc., Syll. Fungorum 6:229. 1888. *Pycnoporus sanguineus* (L.) Murr., Bull. Torr. Bot. Club 31:421. 1904.

*Polyporaceae.* Sporophores thin, coriaceous, sessile, dimidiate, bright red, glabrous; context cinnabar, 1-3 mm thick; tubes 3-5 per mm; spores smooth, hyaline, oblong, 3-4 × 1-2 μ. On dead canes. Argentina, Puerto Rico.

Polyporus tulipiferus (Schw.) Overholts, Wash. Univ. Stud. 3:29. 1915. *Polystictus sinuosus* (Fr.) Lloyd, Myc. Writ. 5:626. 1917.

*Polyporaceae.* Fruiting bodies mostly resupinate; context very thin, white; pores angular, soon splitting into teeth, about 2 per mm; spores hyaline, smooth, 6-7 × 2-3 μ. On dead stalks. Puerto Rico.

Polyscytalum sacchari Speg., Rev. Fac. Agron. y Vet. 2:243. 1896. Sacc., Syll. Fungorum 14:1040-1. 1899.

*Moniliaceae.* Mycelium effuse, superficial, arachnoid; conidia cylindrical to fusoid, hyaline, smooth, 8-14 × 2.5-4 μ. On young dying leaves. Argentina.

Poria ambigua Bres., Atti R. Accad. Sci. Litt. et Arti degli Agiati. 3 (ser. III): 84. 1897. Sacc., Syll. Fungorum 14:189. 1899.

*Polyporaceae.* Fruiting bodies broadly effused; pores white, large, angular, finally dentate-lacerate; spores hyaline, obovate, 5-8 × 3-3.5 μ. Around the base of living stalks. Florida.

*Polystictus occidentalis* (Klotzsch) Cke. See *Polyporus occidentalis* Klotzsch

*Polystictus sanguineus* (L.) Fr. See *Polyporus sanguineus* (L.) Meyer

*Polystictus sinuosus* (Fr.) Lloyd See *Polyporus tulipiferus* (Schw.) Overholts

*Pseudocommis vitis* (Viala and Sauv.) Debr., Comp. Rend. Acad. Paris 120:943-5. 1895.

*Plasmodiophoraceae.* Reported as found on Seréh-diseased canes. Java. Fitzpatrick (The Lower Fungi—Phycomycetes, p. 59, 1930) states "now known to have been founded merely on the products of cell disorganization."

*Pseudomonas vascularum* (Cobb) E. F. Smith See *Bacterium vasculorum* (Cobb) Migula

Psilocybe atomatoides Peck, N. Y. State Mus. Rpt. 29:41. 1878. Sacc., Syll. Fungorum 5:1048. 1887. Thom and Lathrop., Jour. Agr. Res. 30:625-8. 1925.

*Agaricaceae.* Plants solitary to densely caespitose; pileus 3-5 cm broad, convex to flat, smooth, fawn color to avellaneous, margins striately rugose; gills broad, rounded, adnexed to decurrent, without cystidia, becoming purple brown; stipe 3-4 mm diam. × 5-6 cm long; spores 9-12 × 5.5-8 μ, purple

brown, unevenly elliptical, apiculate at one end; microspores on branches of mycelium becoming coiled masses of oidia 15-30 × 25 μ. Principal cause of yellowing and deterioration in piles of baled bagasse. Louisiana.

Pterula capillaris Lév., Ann. Sci. Nat. III, 2:208. 1884. Sacc., Syll. Fungorum 6:742. 1888.

*Clavariaceae.* Fruiting bodies pale ochraceous, 3-4 cm tall. On dead canes. Honduras.

Puccinia kuehnii (Krueger) Butler, Ann. Myc. 12:81-2, 1 fig. 1914. Butler, Fungi and Disease in Plants, pp. 380-1, 1 fig. 1918. *Uromyces kuehnii* Krueger, Ber. Versuchs-Sta. f. Zuckerrohr. West-Java 1:117-121, pl. IX (col.). 1890. Sacc., Syll. Fungorum 11:182. 1895. *Uredo kuehnii* (Krueger) Wakker and Went, Ziekten Suikerriet op Java, pp. 144-6, pl. XIX (col.). 1898. Sydow, Monogr. Ured. 4:608. 1923-4.

*Pucciniaceae.* Sori on elongated orange spots, amphigenous; urediospores oval or pyriform, orange, 29-57 × 18-34 μ; telia black, intermixed with uredo sori; teliospores oblong to club-shaped, rounded or flattened above, narrowed below; 25-40 × 10-18 μ; pedicels very short, hyaline. On leaves of *Saccharum officinarum, S. arundinaceum, S. fuscum, S. narenga, S. spontaneum.* *Rust.*

Ceylon, China, Fiji, Formosa, Guam, India, Indo-China, Japan, Java, New So. Wales, Philippine Islands, Queensland, Sumatra.

Puccinia purpurea Cooke, Grevillea 5:15. 1876. Sacc., Syll. Fungorum 7:657. 1888.

*Pucciniaceae.* Sori amphigenous on broad spots; urediospores subglobose to pyriform, verrucose, yellow-brown, 28-40 × 20-28 μ; paraphyses numerous; teliospores smooth, ellipsoid, apices rounded, 35-36 × 22-32 μ; pedicels hyaline, persistent, up to 100 μ long. On leaves. Bermuda, Philippine Islands.

*Pycnoporus sanguineus* (L.) Murr. See *Polyporus sanguineus* (L.) Meyer

Pyrenochaeta sp.

*Phomaceae.* An unnamed species associated with a leaf spot of the variety E. K. 28. Spots appearing on young leaves, oval, 2-5 mm in length, often coalescing, at first white, changing to tilleul buff with a narrow livid brown border line. (Bitancourt, Proc. 6th Cong. Internat. Soc. Sugar Cane Tech., Baton Rouge, 1938.) São Paulo.

Pythium spp.

*Peronosporaceae.* Unnamed species associated with root rot, Lahaina disease, etc. Brazil, British Guiana, British West Indies, Cuba, Dominican Republic, Formosa, Hawaii, Japan, Java, Louisiana, Mauritius, North Coast South America, Philippine Islands, Puerto Rico, S. E. United States.

Pythium aphanidermatum (Edson) Fitzpatrick, Mycologia 15:166. 1923. *Rheosporangium aphanidermatum* Edson, Jour. Agric. Res. 4:279, pls. 44-48. 1915. Carpenter, Exp. Sta. Hawaii. Sugar Planters' Assoc. Bull. 3 (Bot. Ser.) :59-65, pls. 16-23. 1921.

*Peronosporaceae.* Sporangia lobulate, dactyloid; oogonia terminal, smooth, spherical 16-27 μ (aver. 22.5 μ) in diam.; antheridia one to an oogonium, usually subterminal, with a broad lateral protrusion from the normal diameter of the stalk which projects slightly beyond; antheridial stalks often connected

at some little distance with hypha bearing oogonium; oospores smooth, spherical, thick-walled, not filling oogonium. Reported in Hawaii, "an active factor in root disease of cane" (Lahaina disease), but organism subsequently identified as *Pythium butleri* Subr. and still later as *P. graminicolum* Subr. and *P. arrhenomanes* Drechsler. Infrequently isolated from rotted roots in Louisiana (Rands, Internat. Soc. Sugarcane Tech. Proc. 3:119, 1930) and found to be "weakly parasitic" on sugarcane.

PYTHIUM ARRHENOMANES Drechsler, Phytopath. 18:873-5, 1928; 26:676-84, 3 figs. 1936. Carpenter, Hawaii. Planters' Rec. 38:279-338, 26 figs. 1934 (as *P. graminicolum* Subr.). Rands and Dopp, Jour. Agr. Res. 49:189-221, 12 figs. 1934. U. S. Dept. Agr. Tech. Bull. 666 (in press). 1938. *Nematosporangium arrhenomanes* (Drechsler) Sideris, Mycol. 23:252-95. 1931. *N. arrhenomanes* (Drech.) Sideris, var. *hawaiiensis* Sideris (l.c.), *N. epiphanosporon* Sideris (l.c.), *N. hyphalosticton* Sideris (l.c.), *N. leiohyphon* Sideris (l.c.), *N. leucosticon* Sideris (l.c.), *N. polyandron* Sideris (l.c.), *N. rhizopthoron* Sideris (l.c.), *N. spaniogamon* Sideris (l.c.), *N. thysanohyphalon* Sideris (l.c.).

*Peronosporaceae.* Sporangia lobulate, composed of inflated communicating elements up to 20 $\mu$ diam., often in extensive compound complexes; zoospores 12 $\mu$ diam. (average); oogonia (on carrot-cornmeal agar) subspherical, terminal or rarely intercalary, 21-42 $\mu$ (average 28.5 $\mu$) in diam.; antheridia crook-necked, numerous (4-20), at ends of branches of hyphae mostly very remotely connected with hypha bearing oogonium, rather quickly becoming indiscernible; oospores thin-walled completely filling oogonia, 20-40 $\mu$ (average 27.3 $\mu$). Highly variable species existing as many difficultly separable morphologic and physiologic races (Rands and Dopp, l. c.). Aggressively parasitic, causing a soft, watery, rot of root tips and rootlets of sugarcane, sorghum, maize, and other cereals and grasses. Hawaii, Mauritius, United States. *Root rot.*

PYTHIUM ARRHENOMANES Drechsler var. CANADENSIS Vanterpool and Truscott, Canad. Jour. Res. 6:76, pl. 1, figs. 2-3. 1932. Rands and Dopp, Jour. Agr. Res. 49:189-221. 1934.

*Peronosporaceae.* Stated to be different from the species in more ready production of sexual bodies and less ready formation of sporangia in culture, slightly larger oogonia, and presence of only 3-6 antheridia per oogonium. Comparison of type culture with many strains of the species by Rands and Dopp (l.c.) indicated such differences are of no practical taxonomic significance. Aggressively parasitized sugarcane roots in experiments. Canada.

*Browning root rot of cereals.*

PYTHIUM ARRHENOMANES Drechsler var. PHILIPPINENSIS Roldan, Phil. Agric. 19:32, 1930; 21:165-176, 4 figs. 1932.

*Peronosporaceae.* Differs from the species in fewer visible antheridia and other minor characters of dubious significance in relation to the variability of the species. Pathogenic on sugarcane roots. Causing root rot of corn. Philippine Islands.

PYTHIUM ARTOTROGUS (Mont.) de By., Abh. Seneck. Ges. 12: pl. I, and Botan. Zeit. 39:578. 1881. Sacc., Syll. Fungorum 11:244. 1895. Matthews, Studies on the Genus Pythium, pp. 107-10, 2 figs. 1931.

*Peronosporaceae.* Oogonia spherical, usually intercalary, 18-27 $\mu$ in diam., with few to many spiny processes, 3-6 $\mu$ long; oospores smooth, 15-24 $\mu$ in diam. In deteriorated seed cane. Louisiana.

Pythium artotrogus (Mont.) deBy. var. macracanthum Sideris, Mycol. 24:47, figs. 4(c), 6(g). 1932.

*Peronosporaceae.* Differs from the species in having some epigynous antheridia, in the greater length of the spines of its oogonium, and the greater amount of aerial mycelium produced on culture media. Pathogenic on roots. Hawaii.

Pythium butleri Subramaniam, Mem. Dept. Agric. India (Bot. Ser.) 10:193, pls. V, VI. 1919. Drechsler, Phytopath. 24:7. 1934. Rands and Dopp, U. S. Dept. Agric. Tech. Bull. 666 (in press). 1938.

*Peronosporaceae.* Sporangia torulose to digitate, often in intricate complexes; oogonia spherical or subspherical, 18-33 $\mu$ (aver. 26 $\mu$) diam.; antheridia knob-shaped, terminal or intercalary, arising often from a different hypha from that bearing the oogonium; oospores spherical, smooth, thick-walled, 13.5-25.3 $\mu$ (aver. 21 $\mu$) in diam. Occasionally isolated from rotted rootlets. Florida.

Pythium complectens Braun, Jour. Agric. Res. 29:399, pls. 1-5. 1924. Rands and Dopp, U. S. Dept. Agric. Tech. Bull. 666 (in press). 1938.

*Peronosporaceae.* Sporangia smooth, spherical, terminal or intercalary 16.4-27.3 $\mu$ (aver. 21.8 $\mu$) in diam., without papilla; oogonia smooth, subspherical, 13.2-23.3 $\mu$ (aver. 18.6 $\mu$) in diam; antheridia arising from same or adjacent hyphae, trumpet-shaped to broadly irregularly lobed, clasping a large part of the oogonia, persistent; oospores smooth, spherical, 11.3-20.8 $\mu$ (aver. 16.2 $\mu$) in diam. Infrequently isolated from weakened seed roots and not recovered in inoculation test. Louisiana. Drechsler (Phytopath. 28:84, 1938) cites this species as synonymous with *P. vexans* deBy.

Pythium complens Fischer, Rab. Krypto. Flora I, Abt. 4:398, fig. 64b-f. 1892. Sacc., Syll. Fungorum 11:244. 1895. *P. gracile* deBy., Abh. Senckenb. Ges. 12, pl. 2 (figs. 6-15). 1881. Ward, Quart. Jour. Micro. Sci. 23:503-15, pls. XXXV (figs. 22-30), XXXVI (figs. 31-36). 1883.

*Peronosporaceae.* Sporangia consisting of filamentous or torulose hyphae, or enlarged, lobulate, branched complexes; oogonia intercalary, smooth, spherical, 11-25 $\mu$ (aver. 17 $\mu$) in diam.; antheridia 1-2, arising as short, delicate branches from the oogonial hyphae near to oogonia and forming a crook-necked structure with narrow attachment to latter. Abundantly isolated from weakened roots, but only mildly parasitic on sugarcane (Rands and Dopp, l. c.). Louisiana.

*Pythium dactyliferum* Drechsler See *P. irregulare* Buisman

Pythium debaryanum Hesse, *P. debaryanum,* ein endophytisches Schmarotzen, u. s. w., Inaug. Diss. Halle, p. 34, 2 pl. 1874. Sacc., Syll. Fungorum 7:271. 1888. Carpenter, Hawaii Agr. Exp. Sta. Press Bull. 54, 9 pp., 8 pls. 1919. Drechsler, Phytopath. 17:54. 1927. Rands and Dopp, U. S. Dept. Agr. Tech. Bull. 666 (in press). 1938.

*Peronosporaceae.* Oogonia smooth or sparsely papillate, spherical or subspherical, intercalary or terminal, 11-22 $\mu$ (aver. 17 $\mu$) in diam.; antheridia 1-2, as slightly swollen ends of longish, curved or arched antheridial branches

arising (when monoclinous) from the hyphae bearing the oogonia at a considerable distance from the latter; oospores smooth, 10-18 $\mu$ in diam. with wall 1 $\mu$ thick; zoospores moderately abundant. Associated with root rot (Lahaina disease), Hawaii; abundantly isolated and weakly parasitic on "seed" roots, and others under unfavorable conditions. Georgia, Hawaii and Louisiana.

Pythium diameson Sideris, Mycol. 24:47-8, figs. 1(D), 6(A), 7. 1932.

*Peronosporaceae.* Oogonia lateral, occasionally intercalary, spherical to subspherical, 15-17 $\mu$ in diam.; antheridia 1-2, clavate; oospores spherical, 15 $\mu$ in diam. with wall 1.5-2 $\mu$ in thickness. Pathogenic to cane roots. Hawaii.

Pythium dissotocum Drechsler, Jour. Wash. Acad. Sci. 20:402-3. 1930. Rands and Dopp, U. S. Dept. Agric. Tech. Bull. 666 (in press). 1938.

*Peronosporaceae.* Sporangia usually undifferentiated mycelial filaments; oogonia terminal or intercalary, smooth, subspherical, 17-28 $\mu$ (aver. 22 $\mu$) in diam.; antheridia 1-3, crooknecked, making broad contact with oogonia, arising close to latter or from a neighboring filament; oospores smooth largely filling oogonia. Abundantly isolated from flaccid root tips and causing important damage under unfavorable conditions. Louisiana.

*Pythium gracile* deBy. See *P. complens* Fischer

Pythium graminicolum Subramaniam, Agric. Res. Inst. Pusa Bull. 177:5, fig. 1. 1928. Carpenter, Hawaii. Planters' Rec. 38:279-338, 26 figs. 1934. Drechsler, Phytopath. 26:676-84, 3 figs. 1936. Rands and Dopp, U. S. Dept. Agric. Tech. Bull. 666 (in press). 1938.

*Peronosporaceae.* Sporangia lobulate often forming extensive complexes somewhat like *P. arrhenomanes;* oogonia spherical, terminal, sometimes intercalary, 16.5-28.6 $\mu$ in diam.; antheridia 2-5 (visible), crooknecked, club-shaped, on hyphal branches fairly closely connected with hyphae bearing oogonia; oospores thick walled, spherical, smooth, filling oogonia, 15.4-26.4 $\mu$ in diam. Causing root rot and seedling collapse, India, and a root rot in Hawaii (?), Puerto Rico, and Louisiana.

Pythium helicoides Drechsler, Wash. Acad. Sci. 20:413-4. 1930. Rands and Dopp, U. S. Dept. Agric. Tech. Bull. 666 (in press). 1938.

*Peronosporaceae.* Aerial mycelium abundant; sporangia mostly terminal on racemose or cymoid branches, 17-45 $\times$ 9-40 $\mu$ with apical papillae, often proliferous; oogonia terminal, subspherical, 26-40 $\mu$ (aver. 33 $\mu$) in diam.; antheridia 1-4, applied to oogonia throughout their length, terminal on branches not closely connected with oogonial hyphae, at least one of them winding about the female hyphal element in 2-4 close helical turns; oospores 21-32 $\mu$ (aver. 27.5 $\mu$) in diam. with wall 2.5-3.2 $\mu$ in thickness. Occasionally isolated from rootlet rot. Florida.

Pythium irregulare Buisman, Meded. Phytopath. Lab. "Willie Commelin Scholten" 11:1, figs. 9-11. 1927. Rands and Dopp, U. S. Dept. Agric. Tech. Bull. 666 (in press). 1938. *P. dactyliferum* Drechsler (nomen nudum) Rands. Cong. Internat. Soc. Sugarcane Tech. Proc. 3:122. 1930.

*Peronosporaceae.* Similar to *P. debaryanum* Hesse except for irregularities or protuberances, often 2-7 in number on oogonial wall. Occasionally isolated from weakened seed-piece roots. Louisiana.

Pythium mamillatum Meurs, Wortelrot, veroorzaakt door Schimmels, etc. Dissert. Baarn, figs. 1-3. 1928.

*Peronosporaceae.* Oogonia usually intercalary, globose with about 20 obtuse, often curved, digitate protuberances 2.7-6 $\mu$ long; oogonia 11-16 $\mu$ (aver. 15 $\mu$) in diam. exclusive of protuberances; antheridia similar to *P. debaryanum,* but often slightly shorter and larger. Cultures provisionally identified as *P. spinosum* Sawada (see Rands, Congress Internat. Soc. Sugarcane Tech. Proc. 3:122, 1930) subsequently assigned to *P. mamillatum.* Frequently isolated from winter root-rot and pathogenic to seed-piece roots. Louisiana.

Pythium periilum Drechsler, Jour. Wash. Acad. Sci. 20:403-4. 1930. Rands and Dopp, U. S. Dept. Agric. Tech. Bull. 666 (in press). 1938.

*Peronosporaceae.* Sporangia filamentous or with a sparingly inflated branching system, though not in intricate complexes; oogonia usually intercalary, smooth, subspherical, 16-22 $\mu$ (aver. 18.8 $\mu$) in diam. with cylindrical part at either pole 4-5 $\mu$ up to delimiting septum; antheridia 2-5 on branches of a single hypha arising from the oogonial hypha at some distance; oospores completely filling oogonia 14-20 $\mu$ (aver. 17.3 $\mu$) in diam. Infrequently isolated from rotted rootlets and weakly pathogenic. Louisiana.

*Pythium spinosum* Sawada See *P. mamillatum* Meurs

Pythium splendens Braun, Jour. Agric. Res. 30:1043-62. 1925. var. hawaiiensis Sideris, Mycol. 24:38-9, figs. 4(D), 5(A), 12. 1932.

*Peronosporaceae.* The variety differs from the species in its stronger aerial mycelial development and larger conidia. Weak parasite on roots. Hawaii.

Pythium ultimum Trow, Ann. Bot. 15:269, pls. 15-16. 1901. Sacc., Syll. Fungorum 16:1123. 1902. Drechsler, Phytopath. 17:54-5. 1927. Rands and Dopp, U. S. Dept. Agric. Tech. Bull. 666 (in press). 1938.

*Peronosporaceae.* Conidia terminal and spherical, or intercalary and barrel-shaped; zoospores never formed; oogonia smooth, terminal or intercalary, 19.6-22.9 $\mu$ (aver. 20.6 $\mu$) in diam.; oospores not filling oogonia, spherical, 14.7-18.3 $\mu$ (aver. 16.3 $\mu$) in diam.; antheridia 1-2, pouch-like, arising in immediate proximity to oogonia. Frequent in rotting seed-piece roots and moderately pathogenic under unfavorable conditions. Louisiana.

Ramularia sp.

*Moniliaceae.* Unnamed species on leaves. Philippine Islands.

*Rheosporangium aphanidermatum* Edson See *Pythium aphanidermatum* (Edson) Fitzpatrick

Rhinocladium sacchari Speg., Rev. Fac. Agron. y Vet. 2:250. 1896. Sacc., Syll. Fungorum 14:1073-4. 1899.

*Dematiaceae.* Mold powdery, sordid olivaceous; fertile hyphae erect, olivaceous, branched, 100-150 $\mu$ tall; conidia acrogenous on tooth-like sterigmata, non-catenulate, obovate, 1-celled, 6-8 $\times$ 3 $\mu$. On dead leaf-sheaths. Argentina.

Rhizoctonia spp.

*Mycelia sterilia.* Undetermined species associated with root rot, on cane trash, etc. Argentina, Australia, Barbados, Brazil, British Guiana, British W. Indies, Cuba, Dominican Republic, Hawaii, India, Java, Louisiana, Mauri-

tius, North Coast So. America, Peru, Philippine Islands, Puerto Rico, Southeast United States, Uganda.

*Rhizoctonia bataticola* (Taub.) Butler See *Macrophomina phaseoli* (Maubl.) Ashby

Rhizoctonia destruens Tassi, Bull. Lab. Ort. Bot. Siena 3:50, pl. IV (figs. a-m). 1900. Sacc., Syll. Fungorum 16:1109. 1902.

*Mycelia sterilia.* Sclerotia subterranean, globose, white, then chestnut brown, white within, 2-5 mm diam. In roots. India. Duggar (Ann. Mo. Bot. Garden 2-451, 1915) suggests, "insufficient affinities with *Rhizoctonia* to be included, but critical study needed."

Rhizoctonia ferruginea Matz, Jour. Dept. Agric. P. Rico 5(1):28-29, figs. 21-22. 1921.

*Mycelia sterilia.* Sclerotia white, finally rusty red, irregular. Isolated from diseased roots. Puerto Rico.

Rhizoctonia grisea (Stevenson) Matz, Jour. Dept. Agric. P. Rico 4(1):40. 1920. Matz, l. c. 5(1):22-24, figs. 13, 14. 1921. Sacc., Syll. Fungorum 25:1004. 1931. *Sclerotium griseum* Stevenson, Report Insular Exp. Sta. P. Rico 1917-18, p. 138. 1919.

*Mycelia sterilia.* Sclerotia light gray, subglobose to hemispheric or flattened, .5-2 mm diam. On dead and dying leaves and leaf-sheaths. Barbados, Dominican Republic, Puerto Rico. It has been suggested that the organism associated with the "banded sclerotial disease" or "Djamoer oepas" of the Orient should be referred here. See *Hypochnus sasakii* Shirai.

Rhizoctonia palida Matz, Jour. Dept. Agric. P. Rico 5(1):28, figs. 18-20. 1921.

*Mycelia sterilia.* Sclerotia small, flat, yellow. Isolated from diseased roots. Puerto Rico.

*Rhizoctonia solani* Kuehn See *Corticium vagum* Berk. and Curt.

Rhizopus sp.

*Mucoraceae.* Unnamed species associated saprophytically with foot rot. Hawaii, Louisiana.

Rhizopus delemar (Boidin) Wehm. and Hanzawa, Mycol. Centralbl. 1:86, 2 pls. 1912. Sacc., Syll. Fungorum 24:7. 1926.

*Mucoraceae.* In fermenting sugar. Japan.

Rosellinia sp.

*Sphaeriaceae.* Undetermined species associated with root disease. Madagascar.

Rosellinia paraguayensis Speg., Anal. Mus. Nac. Buenos Aires (3) 12:338. 1909. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:214, pl. XXXI (figs. 16-18). 1917. *Anthostomella paraguayensis* Speg., Anal. Soc. Cient. Argentina 18:267. 1884. Sacc., Syll. Fungorum 9:510. 1891.

*Sphaeriaceae.* Perithecia black, gregarious, subglobose, 150-200 $\mu$, glabrous, coriaceous, aparaphysate; spores 5-13 $\times$ 5-6 $\mu$, fuliginous. On dead canes. Argentina, Brazil, Puerto Rico.

Rosellinia pulveracea (Ehrh.) Fckl., Symb. Mycol., p. 149. 1869. Sacc., Syll. Fungorum 1:264. 1882.

*Sphaeriaceae.* Perithecia superficial, globose, minutely tuberculate; spores fuscous, 10-12 × 7-9 μ. On dead canes. Puerto Rico.

Rostafinskia australis Speg., Anal. Soc. Cient. Argentina 10:151. 1880. Sacc., Syll. Fungorum 7:403. 1888. (As *Rostafinskya.*) Spegazzini, Anal. Mus. Nac. Hist. Nat. Buenos Aires (3) 13:417. 1910.

*Myxomycetes.* Aethalium pulvinate-effuse; spores globose to ovoid, smooth, lilac colored, 8-10 × 5-6 μ. Rotten stalks. Argentina. The species not recognized by Lister nor Macbride and Martin. Massee (Monograph) considered it a doubtful species.

*Saccharomyces apiculatus* Reess var. *sacchari* Racib. See *Hansenia apiculata* (Reess) Lindner var. *sacchari* Racib.

Saccharomyces conglomeratus Reess, Bot. Unters. Über d. Alkoholgährungspilze, p. 82, pl. II (figs. 14-16). 1870. Sacc., Syll. Fungorum 8:917. 1889. Spegazzini, Rev. Fac. Agron. y Vet. 2:238. 1896.

*Saccharomycetaceae.* Vegetative cells 5-6 μ diam., subglobose; asci 2-4 spored. On dying leaves and culms and in molasses. Argentina. Guilliermond and Tanner (The Yeasts, p. 269, 1920) state, "the existence of this species is problematical."

Saccharomyces mellacei Jörgensen, Microrg. Tread. Franc, p. 279, figs. 64, 65. 1899. Sacc., Syll. Fungorum 16:1153. 1902.

*Saccharomycetaceae.* Fermenting molasses. Jamaica. Guilliermond and Tanner (The Yeasts, p. 200, 1920) use the binomial *Schizosaccharomyces mellacei* Jörgensen.

Saccharomyces mycoderma Reess, Bot. Unters. Über d. Alkoholgährungspilze, p. 83, pl. IV (figs. 10-11). 1870. Sacc., Syll. Fungorum 8:917. 1889. Spegazzini, l. c., p. 238. 1896.

*Saccharomycetaceae.* Cells ovate, elliptical or cylindrical, 6-7 × 2-4 μ; asci 4-spored. Dead and dying culms and in fermenting molasses. Argentina.

Saccharomyces nokkoensis Nakazawa, Ber. d. Inst. für Exper. Forschungen zu Taihoku Bd. III. 1914.

*Saccharomycetaceae.* Cells ellipsoidal, 9.6-10.8 × 3.6-5.25 μ. In fermenting molasses. Formosa.

Saccharomyces vordermannii Went and Prin.-Geerligs, Arch. v.d. Java-Suikerind. 2:544-48, pl. III (figs. 10-13). 1894. Sacc., Syll. Fungorum 11:457. 1895.

*Saccharomycetaceae.* Asci globose-ellipsoid, 8-10 μ diam.; spores globose-ellipsoid, 2 × 4 μ. Concerned in production of the alcoholic drink "arak" from molasses. Java.

Saccharomyces zopfii Artari, Abh. d. Naturforsch. Ges. zu Halle 21:113, illus. 1897. Sacc., Syll. Fungorum 18:201. 1906. Guilliermond and Tanner, The Yeasts, p. 254, 1 fig. 1920.

*Saccharomycetaceae.* Cells ellipsoidal to spherical, 3-6 μ. Concerned in sugar deterioration. Cuba, Germany, Louisiana.

*Schizophyllum alneum* (L.) Schroet. See *Schizophyllum commune* Fr.

SCHIZOPHYLLUM COMMUNE Fr., Syst. Myc. 1:330. 1821. Sacc., Syll. Fungorum 5:655. 1887. Spegazzini, Rev. Fac. Agron. y Vet. 2:227. 1896. *Schizophyllum alneum* (L.) Schroet., Krypt. Fl. Schlesien 3(1):553. 1889. *Schizophyllum lobatum* Bref., Unters. Gesamentgeb. Mykol. 8:67. 1889. Sacc., Syll. Fungorum 14:123. 1899. (as *S. lobatum* Went). *Schizophyllum radiatum* (Swartz) Fr. ex Linder, Amer. Jour. Bot. 20:557-8, 3 pls. 1933.

*Agaricaceae.* Pileus thin, soft, coriaceous, sessile to short pseudo-stipitate, suborbicular to flabelliform, 1-4 cm broad; surface whitish villose to hirsute, white to umbrinous; gills radiating, bifid, edges revolute, gray; spores cylindrical, smooth, hyaline, 6-7 × 2-2.5 μ. On dead and dying canes as a wound parasite. *Schizophyllum rot.*

Argentina, Brazil, British Guiana, British W. Indies, Cuba, Dominican Republic, Formosa, Haiti, Hawaii, India, Indo-China, Japan, Java, Martinique, Mexico, Philippine Islands, Puerto Rico, Trinidad, Union So. Africa, United States.

*Schizophyllum lobatum* Bref. See *Schizophyllum commune* Fr.

*Schizophyllum radiatum* (Swartz) Fr. See *Schizophyllum commune* Fr.

SCHIZOSACCHAROMYCES FORMOSENSIS Nakazawa, Ber. d. Inst. für Exp. Forschungen (Taihoku) Bd. III. 1914. Guilliermond and Tanner, The Yeasts, p. 203, 1 fig. 1920.

*Saccharomycetaceae.* Cells ellipsoidal to irregular, 6-9 × 7.2 μ. In fermenting molasses. Formosa. Var. *akoensis* Nak. and var. *tapaniensis* Nak. also present, the former with cells larger than those of the species and the latter with intermediate cells.

SCHIZOSACCHAROMYCES SAUTAWENSIS Nakazawa, Ber. d. Inst. für Exp. Forschungen (Taihoku) Bd. III. 1914. Guilliermond and Tanner, The Yeasts, p. 204. 1920.

*Saccharomycetaceae.* Cells elliptical, 7.2-8.4 × 4.8 μ. In fermenting molasses. Formosa.

SCIRRHIA LOPHODERMIOIDES E. and E., Bull. Torr. Bot. Club 22:435. 1895. Sacc., Syll. Fungorum 14:679. 1899.

*Dothideaceae.* Stromata elliptical or linear, .5-8 mm long, erumpent, black; spores cylindrical, greenish hyaline, 35-40 × 7-8 μ. On dead cane. Puerto Rico.

SCLEROSPORA sp.

*Peronosporaceae.* Undetermined species on leaves. Formosa, India, Siam, Queensland. On *Saccharum spontaneum,* Philippine Islands, Siam.

SCLEROSPORA GRAMINICOLA (Sacc.) Schroet., Hedw. 18:86. 1879. Sacc., Syll. Fungorum 7:238. 1888.

*Peronosporaceae.* Transferred to *Saccharum* by inoculation. Melhus, et al, Iowa Agric. Exp. Sta. Bull. 111:304. 1928.

SCLEROSPORA MISCANTHI Miyake *in* Sacc., Syll. Fungorum 24:65. 1926. *Sclerospora macrospora* (?) Miyake, Sugar Exp. Sta. Formosa Bull. 1:58, tab. IX. 1911.

*Peronosporaceae.* This species, usually treated as specific on *Miscanthus,* is reported on *S. spontaneum* and *S. officinarum.* Oogonia spherical or irregu-

lar, 48-72 $\mu$; oospores spherical, 40-56 $\mu$ diam. (47-48.9 $\mu$ by Weston, Phytopath. 19:965. 1929). Philippine Islands.

SCLEROSPORA PHILIPPINENSIS Weston, Jour. Agric. Res. 19:118, col. pls. A, B; pls. 16-25. 1920. *S. indica* Butl., ex Uppal and Weston, Indian Jour. Agr. Sci. 6:715-9, pl. XLII. 1936.

*Peronosporaceae.* This species usually treated as specific to *Zea* and *Euchlaena* is reported on *Saccharum spontaneum* by Stevens. Philippine Islands.

SCLEROSPORA SACCHARI Miy., Sugar Exp. Sta. Formosa Bull. 1:12-13, 9 pls. 1911. (Translation Sugar 24:619. 1922.) Sacc., Syll. Fungorum 24:65. 1926.

*Peronosporaceae.* Conidiophores erect, arising from stomata, 160-170 $\mu$; conidia elliptical or oblong, produced nocturnally, evanescent, germinating by germ tube, 25-41 $\times$ 15-23 $\mu$; oospores in host tissues, yellow, globular, thick-walled, 40-50 $\mu$; oogonium chestnut-brown, irregularly elliptical, 49-58 $\times$ 55-73 $\mu$. Producing yellow stripes on leaves which split along the stripes giving a characteristic shredded appearance. Young diseased canes produce aerial broom-like growths. *Downy mildew, leaf stripe, leaf-splitting disease.*

Fiji, Formosa, India, Japan, New Guinea, Philippine Islands, Queensland, Siam.

SCLEROSPORA SPONTANEA Weston, Jour. Agric. Res. 20:678, 4 pls. 1921. Sacc., Syll. Fungorum 24:167. 1926.

*Peronosporaceae.* Conidiophores 350-550 $\mu$ long; sterigmata 13 $\mu$; conidia hyaline, ellipsoid to cylindrical, 39-45 $\times$ 15-17 $\mu$. Downy mildew of leaves of *Saccharum officinarum* and *S. spontaneum.* Philippine Islands, Siam.

SCLEROTIUM sp.

*Mycelia sterilia.* Mycelium binds upper leafsheaths, choking and killing growing point and stem, followed by secondary rot; sclerotia superficial, pink. India, Philippine Islands, Queensland. *Spindle-top.*

*Sclerotium* sp. See *Hypochnus sasakii* Shirai

*Sclerotium bataticola* Taub. See *Macrophomina phaseoli* (Maubl.) Ashby

*Sclerotium griseum* Stevenson See *Rhizoctonia grisea* (Stevenson) Matz

SCLEROTIUM ROLFSII Sacc., Ann. Myc. 9:257. 1911. Sacc., Syll. Fungorum 22: 1500. 1913. Wakker and Went, Ziekten Suikerriet op Java, pp. 121-8, col. pl. XIV (figs. 2-3). 1898. Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:201-2, pl. XXV (fig. 3). 1917.

*Mycelia sterilia.* Mycelium white, feathery, growing up along leaf sheaths, binding them together and causing a characteristic red rot; sclerotia superficial, spherical, white through yellow-brown to deep red-brown, .5-.8 mm diam., "mustard-seed-like." *Red rot of the leaf-sheath.*

Antigua, Argentina, Australia, Barbados, Brazil, British Guiana, British W. Indies, Cuba, Dominican Republic, Fiji, Formosa, Hawaii, India, Indo-China, Jamaica, Java, North Coast So. America, Philippine Islands, Puerto Rico, Southern United States, St. Croix, Trinidad. Japanese workers have reported *Corticium (Hypochnus) centrifugum* (q.v.) as the perfect stage. Curzi (Bol. R. Staz. Pat. Veg. n.s. 11:306, 9 pls., 1931), however, sets up the binomial *Corticium rolfsii* n.n., stating that *C. centrifugum* cannot be considered

the perfect stage of the true *S. rolfsii*. See also Mundkur, Indian Jour. Agr. Sci. 4:779-81, 1 pl. 1934.

SCOPULARIA sp.

*Dematiaceae*. An abundant gray mold on germinating cane. Saprophytic. Louisiana.

SCYTINOTUS DISTANTIFOLIUS Murr., No. Amer. Flora 9:239. 1915. Sacc., Syll. Fungorum 23:175. 1925.

*Agaricaceae*. Pilei resupinate, becoming sessile, imbricate, 5-10 mm across; surface smooth, white, pruinose to glabrous; context thin, white; gills very distant, irregular, yellowish. On dead leaves. Puerto Rico.

SEPTONEMA SACCHARI Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:225. 1917. Sacc., Syll. Fungorum 25:811. 1931.

*Dematiaceae*. Small black patches on substrata; conidia catenulate, 1-3 septate, basal cell truncate, brown, minutely spiny, 13-25 × 7.25 μ. On dead leaves. Puerto Rico.

SEPTORIELLA PHILIPPINENSIS Sacc., Nuovo Giorn. Bot. Ital. 23:211. 1916. Sacc., Syll. Fungorum 25:480. 1931.

*Phomaceae*. Stromata innate-erumpent, black, 2 mm long; conidia bacillar, often curved, 5-6 septate, 60-65 × 3.5-3.7 μ. On dying leaves of *Saccharum spontaneum*. Philippine Islands.

SPEGAZZINIA ORNATA Sacc., Michelia 2:172. 1882. Sacc., Syll. Fungorum 4:758. 1886. Bessey, Jour. Mycology 13:43-45, 1 pl. 1907.

*Tuberculariaceae*. Sporodochia superficial, hemispherical, compact, black; conidia sarcinaeform, 4-celled, heavily constricted at the septae, fuliginous, strongly tuberculate, 16-20 μ diam.; conidiophores 30-40 μ long. On dead leaves. Puerto Rico. On *Saccharum ciliare*. Java. Bessey (l.c.) suggests that *S. tessarthra* is synonymous.

SPEGAZZINIA TESSARTHRA (Berk. and Curt.) Sacc., Syll. Fungorum 4:758. 1886.

*Tuberculariaceae*. Sporodochia olivaceous, variable; cells of conidia smooth, then echinulate, 25 μ diam. On dead leaves. Alabama.

SPEGAZZINIA TUCUMANENSIS Speg., Rev. Fac. Agron. y Vet. 2:256. 1896. Sacc., Syll. Fungorum 14:1132. 1899.

*Tuberculariaceae*. Sporodochia superficial, black, hemispherical, .5-1.5 mm diam.; conidia sarciniform, 4-celled, with many sterigmata or protuberances on which microconidia are borne, black, 14-16 × 7-10 μ. Spegazzini says his species differs from *S. ornata*, but may be *S. tessarthra*. On rotten cane trash. Argentina.

SPHAERELLA SACCHARI Speg., Rev. Fac. Agron. y Vet. 2:230. 1896. Sacc., Syll. Fungorum 14:533. 1899.

*Sphaeriaceae*. Spots none or indefinite; perithecia hypophyllous, crowded, immersed, 130-180 μ diam., aparaphysate; spores ellipsoid, 1-septate, hyaline, 16-20 × 5-6 μ. On dead leaves. Argentina, Cuba, Puerto Rico, Venezuela.

*Sphaerella sacchari* Wakker See *Sphaerella wakkeri* Sacc. and Syd.

SPHAERELLA SACCHAROIDES Peck, New York State Mus. Bull. 167:48. 1913. Sacc., Syll. Fungorum 24:867. 1928.

*Sphaeriaceae.* Spots definite, oblong, .5-1 cm long, white, brownish on margin; perithecia black, epiphyllous; spores oblong or subfusiform, hyaline, 1-septate, 25-30 × 5-6 μ. Differs from Spegazzini's species in causing definite whitish spots, and in having longer asci and spores. On leaves. Cuba.

SPHAERELLA STRIATIFORMANS (Cobb) Delacroix, Mal. Plant. Cult. de les Pays Chauds, p. 568, pl. LXIX (fig. 1). 1911. *Sphaerella striatiformans* (Cobb) Sacc. and Trott. *in* Sacc., Syll. Fungorum 24:867. 1928. *Mycosphaerella striatiformans* Cobb, Hawaii. Sugar Planters' Assoc. Exp. Sta. Bull. (Path. and Phys. Ser.) 5:208, fig. 48. 1906.

*Sphaeriaceae.* Perithecia hypophyllous, dark, subglobose, 140 μ diam.; spores nearly hyaline, 2-celled, slightly constricted at septa, 15-16 × 5.5-6 μ. Associated with shredding of leaves. Fiji, Hawaii, Java.

*Leaf-splitting disease.*

SPHAERELLA WAKKERI Sacc. and Syd. *in* Sacc., Syll. Fungorum 14:533. 1899. *Sphaerella sacchari* Wakker *in* Wakker and Went, Ziekten Suikerriet op Java, p. 196. 1899.

*Sphaeriaceae.* Perithecia immersed, dark-fuscous, 64 μ diam.; spores hyaline, fusoid, acute at both ends, 1-septate, 16 × 4 μ. On dead leaves. Java.

*Sphaeria gelatinosa* Tode See *Chromocrea gelatinosa* (Tode) Seaver

SPHAEROBOLUS STELLATUS Tode, Fung. Meckl. 1:43. 1790. Sacc., Syll. Fungorum 7:46. 1888. Coker and Couch, Gastromycetes East. U. S. and Canada, p. 147, pls. 82, 117. 1928.

*Nidulariaceae (Sphaerobolaceae).* Plants 1.5-2 mm diam., dull ochraceous to white, spherical, then opening by 4-7 stellate lobes, ejecting central spore-balls which are smooth, dark-chestnut brown; spores smooth, oblong, 7.4-10 × 3.7-4.8 μ. On cane trash. Puerto Rico.

*Sphaeronema adiposum* Butler See *Ceratostomella adiposum* (Butler) Sartoris

SPHAEROPSIS PSEUDO-DIPLODIA (Fckl.) Delacr., Bull. Soc. Myc. France 19:350-2. 1903. *Diplodia pseudo-diplodia* Fckl., Symb. Mycol., p. 393. 1869-70. Sacc., Syll. Fungorum 3:341. 1884.

*Phomaceae.* Conidia oblong-ovate, fuscous, non-septate, 25 × 12 μ. "Parasitic at tip of culm." Brazil. Not clear what fungus Averna-Sacca had (Bol. Agric. São Paulo 17:638-40, 2 figs., 1917). Delacroix considers the fungus identical with *Sphaeropsis malorum* Pk.

*Sphaeropsis sacchari* Cke. See *Macrophoma sacchari* (Cke.) Berl. and Vogl.

SPHAERULINA SACCHARI P. Henn., Hedwigia 44:62. 1905. Sacc., Syll. Fungorum 17:694. 1905.

*Sphaeriaceae.* Spots round, oblong or confluent, pale, red-brown borders; perithecia hypophyllous, immersed, then erumpent, 80-100 μ diam.; spores oblong, fusoid or clavate, 3-septate, constricted at septa, 15-20 × 3.5-4 μ. On leaves. Costa Rica, Peru, Philippine Islands.

*Sporochisma paradoxum* de Seynes See *Ceratostomella paradoxa* (de Seynes) Dade

SPOROCYBE SACCHARI Speg., Rev. Fac. Agron. y Vet. 2:253. 1896. Sacc., Syll. Fungorum 14:1110. 1899.

*Stilbaceae.* Conidial masses 40-80 μ diam.; conidia 1-celled, dark, smooth, ovate or elliptical, 6-10 × 3-5 μ. On rotten trash. Argentina.

Sporodesmium sacchari Speg., Anal. Mus. Nac. Buenos Aires (3)13:443, 1 fig. 1910. Sacc., Syll. Fungorum 22:1404. 1913.

*Dematiaceae.* Acervuli linear, compact, black, 3-15 mm long; conidia ovate to pyriform, muriform, scarcely constricted at septa, 16-22 × 10-12 μ. On rotten culms. Argentina.

Stachybotrys pulcra Speg., Rev. Fac. Agron. y Vet. 2:248. 1896. Sacc., Syll. Fungorum 14:1071. 1899.

*Dematiaceae.* Fertile hyphae erect, 100-200 μ high, fuliginous; conidia acrogenous, ellipsoid, 10-15 × 5-6 μ. On dead and dying leaves and culms. Argentina.

Stauronema sacchari Syd. and Butl., Ann. Myc. 14:217. 1916. Sacc., Syll. Fungorum 25:530. 1931.

*Excipulaceae.* Pycnidia aggregated, sessile, superficial, concave, black, .3-.6 mm diam.; setae numerous, rigid, black, with obtuse apices, 70-350 × 6-9 μ; conidia cylindrical, curved, 1-celled, hyaline, 10-12 × 3 μ. On rotten culms. India.

Stemonitis fusca Roth., Roem. Mag. Bot. 2:26. 1787. Macbride and Martin, The Myxomycetes, p. 162, pl. XI (figs. 249-60). 1934.

*Stemonitaceae.* Sporangia cylindrical, in tufts, fuscous, 6-8 mm high; stems black, shining; spores fuscous in mass, pale violet, with blunt spines or warts, 10 × 7.5 μ. On cane trash. Puerto Rico.

Stemonitis herbatica Pk., New York State Mus. Report 26:75. 1874. Macbride and Martin, The Myxomycetes, p. 170, pl. XII (figs. 276-7). 1934.

*Stemonitaceae.* Sporangia in scattered tufts, cylindrical, stipitate or nearly sessile, natal-brown, 3-7 mm tall; stipes black; spores pale brown, minutely warted, 7-9 μ. On cane trash. British Guiana.

Stemonitis splendens Rost., Monogr., p. 195. 1875. Macbride and Martin, The Myxomycetes, p. 166, pl. XI (figs. 262-3). 1934.

*Stemonitaceae.* Sporangia long, cylindrical, flexuous, natal-brown, 14-23 mm tall; stems black, polished; spores verrucose, lilaceous brown, 8 μ diam. On cane trash. Puerto Rico.

*Sterigmatocystis flavipes* Bainier and Sartory See *Aspergillus flavipes* (Bainier and Sartory) Thom and Church

*Sterigmatocystis niger* v. Tiegh. See *Aspergillus niger* v. Tiegh.

*Sterigmatocystis sydowi* Bainier and Sartory See *Aspergillus sydowi* (Bainier and Sartory) Thom and Church

Stigmella sacchari Speg., Rev. Fac. Agron. y Vet. 2:251. 1896. Sacc., Syll. Fungorum 14:1091. 1899.

*Dematiaceae.* Acervuli orbicular to pulvinate, dark, 100-150 μ diam.; conidia ellipsoid or ovate, muricate, fuliginous, 20-30 × 10-15 μ. On dead and dying leaves. Argentina.

STIGMINA PULCHELLA Speg., Rev. Fac. Agron. y Vet. 2:251. 1896. Sacc., Syll. Fungorum 14:1084. 1899.

*Dematiaceae.* Acervuli small, black, irregular; conidia fusiform, 3-4 septate, constricted at septa, 20-24 × 6-8 μ. On dead leaves. Argentina.

STIGMINA SACCHARI Speg., Rev. Fac. Agron y Vet. 2:251. 1896. Sacc., Syll. Fungorum 14:1083. 1899.

*Dematiaceae.* Acervuli black, 60-100 μ diam.; conidia fusiform or subclavate, obtuse at both ends, 2-septate, constricted at septa, fuliginous-olivaceous, 18-25 × 5-7 μ. On dead and dying leaves. Argentina.

STILBUM sp.

*Stilbaceae.* On dead canes. Puerto Rico.

STILBUM INCARNATUM Wakker *in* Wakker and Went, Ziekten Suikerriet op Java, p. 197. 1898. Sacc., Syll. Fungorum 14:1108. 1899.

*Stilbaceae.* Stipes incarnate, 2 mm long; conidia hyaline, oval, in mucous-heads, pink, 12 × 6 μ. On rotten canes. Java.

STILBUM PROLIFERUM Marchal, Bull. Soc. Belge Microsc. 20:267, pl. VIII (fig. 3). 1894. Sacc., Syll. Fungorum 11:640. 1895.

*Stilbaceae.* Coremia 600-800 × 35-60 μ; heads globose, bright red, 120-150 μ diam.; conidia ellipsoid, hyaline, 5-7 × 2.5-3.5 μ. On rotten culms. Belgian Congo.

*Strumella sacchari* Cke. See *Melanconium sacchari* Mass.

SYNCEPHALASTRUM sp.

*Mucoraceae.* An undetermined species in deteriorating sugar. Louisiana.

TAPESIA sp.

*Mollisiaceae.* An undetermined species on dead canes. Puerto Rico.

TETRACOCCOSPORIS SACCHARI Stevenson, Jour. Dept. Agric. P. Rico 1:225, pl. XXVII (figs. 19, 20). 1917. Sacc., Syll. Fungorum 25:863. 1931. (As *Tetracoccosporium.)*

*Dematiaceae.* Fungus masses sooty, black, subcircular to irregular, 1-2 mm diam.; fertile hyphae erect, hyaline to smoky; septa as broad black bands; conidia pleurogenous, sessile, covering conidiophores in regular series, rugulose, cruciately divided into 4 cells, 10 μ diam. Dead leaves. Puerto Rico.

TETRAPLOA ARISTATA Berk. and Br., Ann. Nat. Hist. (2)5:460, pl. IX (fig. 6). 1850. Sacc., Syll. Fungorum 4:516. 1886.

*Dematiaceae.* Fungus masses dark olivaceous; conidia oblong, muriform, ochraceous-fuliginous, 30 × 22 μ; beaks concolorous, 3-4 septate, 60-90 × 4 μ. On dead leaves and stalks. Alabama, Barbados, Cuba, Dominican Republic, Puerto Rico.

*Thelephora dendritica* Pers. See *Cladoderris dendritica* (Pers.) Berk.

*Thielaviopsis ethaceticus* Went See *Ceratostomella paradoxa* (deSeynes) Dade

*Thielaviopsis paradoxa* (deSeynes) v. Hoeh. See *Ceratostomella paradoxa* (de Seynes) Dade

*Thyridaria tarda* Bancroft See *Physalospora rhodina* (Berk. and Curt.) Cke.

Torula communis Browne, Jour. Ind. Eng. Chem. 10:178-90. 1918.

*Dematiaceae.* Cells yeast-like, black. In Cuban raw sugar examined in New York.

Torula dichroa Sacc., Nuovo Giorn. Bot. Ital. 23:213. 1916. Sacc., Syll. Fungorum 25:760. 1931.

*Dematiaceae.* Mycelium effuse, olivaceous; conidia globose. smooth, catenulate, fuliginous, 7.5-8.5 $\mu$ diam. On dead culms of *Saccharum spontaneum.* Philippine Islands.

Trametes nivosa (Berk.) Murr., No. Amer. Fl. 9:42. 1907. *Polyporus nivosus* Berk., Jour. Bot. and Kew Misc. 8:196. 1856. Sacc., Syll. Fungorum 6:140. 1888.

*Polyporaceae.* On dead canes. Dominican Republic, Puerto Rico. Specimens referred here are probably not true *Tr. nivosa.*

Trametes pusilla Racib., Arch. v. de Java-Suikerind. 6:489-90. 1890.

*Polyporaceae.* Fruiting bodies arising at leaf-scar, leathery, semi-circular, 2 cm wide $\times$ 1 cm high, covered with glistening hairs 2 mm long, zonate above, light yellow alternating with dark brown; pores round to 5-6 angular near base of fruit. Causing large, dry cavities (lined with thick, white mycelial layer) in internodes of standing cane, resulting in breakage and death of top. Java. No further references to this species found.

Treleasia sacchari Speg., Rev. Fac. Agron. y Vet. 2:235. 1896. Sacc., Syll. Fungorum 14:640-41. 1899.

*Hypocreaceae.* Stromata superficial, white, cottony; perithecia imbedded, long beaked; spores linear-fusiform, acute, 1-septate, smooth, hyaline, 50-60 $\times$ 7-8 $\mu$. On decaying leaves. Argentina.

Treleasiella sacchari Speg., Rev. Fac. Agron. y Vet. 2:242. 1896. Sacc., Syll. Fungorum 14:989. 1899.

*Zythiaceae.* Acervuli 1-3 mm diam., red; pycnidia immersed; conidia cylindrical, 1-celled, hyaline, 7-10 $\times$ 4-5 $\mu$. On dead cane. The imperfect stage of *Treleasia sacchari* Speg. Argentina.

Tremellodendron simplex Burt., Ann. Mo. Bot. Garden 2:742-3, pl. 26 (fig. 5). 1915. Sacc., Syll. Fungorum 23:575. 1925.

*Tremellaceae.* Fructifications 2 cm long, 2 mm thick, erect or suberect, brittle, wrinkled, black above, olive-ocher toward the base; spores hyaline, smooth, 7.5-9 $\times$ 5-6 $\mu$. On dead cane. Puerto Rico.

Trichoderma sp.

*Moniliaceae.* Unnamed species as a saprophyte in diseased roots, and in deteriorating sugar. Louisiana.

Trichoderma koningi Oud., Arch. Neerl. Sci. Nat. ser. 2, 7:291, pl. 31 (figs. 1-7). 1902. Sacc., Syll. Fungorum 18:512. 1906.

*Moniliaceae.* Colonies floccose; conidiophores up to 25 $\mu$ long; fruiting heads up to 10 $\mu$ diam.; conidia oblong to elliptical, smooth, hyaline, 3.2-4.8 $\times$ 1.8-3 $\mu$. Associated with diseased roots. Peru. Often confused with the following species.

Trichoderma lignorum (Tode) Harz, Bull. Soc. Imper. Nat. Moscou 44:116, pl. 4 (fig. 6). 1871. Sacc., Syll. Fungorum 4:59. 1886. Spegazzini, Rev. Fac. Agron. y Vet. 2:244. 1896.

*Moniliaceae.* Colonies tufted, conidiophores up to 60 $\mu$ long; conidial heads 6.5-10 $\mu$ diam.; conidia smooth, hyaline, ovoid, 3.8-5 $\times$ 2.5-3 $\mu$. On dead and dying stalks and leaves, and associated with death of cuttings. Barbados, British Guiana, Hawaii, Java, Louisiana, Puerto Rico, Virgin Islands.

*Trichosphaeria sacchari* Mass. See *Melanconium sacchari* Mass.

Triposporium muricatum Wakker *in* Wakker and Went, Ziekten Suikerriet op Java, p. 197. 1898. Sacc., Syll. Fungorum 14:1107. 1899.

*Dematiaceae.* Conidia solitary, fuscous, spherical, 3-radiate, each section muricate. On dead leaves. Java.

Trogia sp.

*Agaricaceae.* An unnamed species on dead canes. Puerto Rico.

*Trullula sacchari* Ell. and Everh. See *Melanconium sacchari* Mass.

Tuberculariа saccharicola Speg., Rev. Fac. Agron. y Vet. 2:254. 1896. Sacc., Syll. Fungorum 14:1115. 1899.

*Tuberculariaceae.* Sporodochia pulvinate, white to pink, .3-.5 mm diam.; conidia ovate or elliptical, ends obtuse, smooth. On dead canes. Argentina, Dominican Republic, Puerto Rico.

*Uredo kuehnii* (Krueger) Wakker and Went See *Puccinia kuehnii* (Krueger) Butler

*Uromyces kuehnii* Krueger See *Puccinia kuehnii* (Krueger) Butler

*Uromyces sacchari* Krueger *in* Racib. Fungi Jav. No. 26. In error for *Uromyces kuehnii* Krueger See *Puccinia kuehnii* (Krueger) Butler

Ustilaginoidea sacchari-narengae K. Saw., Taiwan Hakubutsu Gakkwai Kwaihô (Jour. Formosan Nat. Hist. Soc.) 4 (15) : 4-5, pl. 3. 1914. Tanaka, Mycologia 14:87. 1922. Sacc., Syll. Fungorum 23:632. 1925.

*Dematiaceae.* Stromata in ovaries, dark brown, top shaped, at first covered by membrane, then rupturing to expose dark olive spore masses; conidia globose or ovoid, warted, dark olive, 4-5.5 $\mu$. Parasitic in ovaries of *Saccharum narenga.* Formosa.

Ustilago consimilis Syd., Ann. Myc. 22:281. 1924.

*Ustilaginaceae.* Differs from *U. scitaminea* Syd. in spore size, 5-7 $\mu$ (aver. 6). Sori deforming inflorescences of *Saccharum fuscum.* India. Earlier reports from India of *U. sacchari* on this host presumably refer to this species. Zundel (Mycologia 22:27-8, 1930) refers here all smuts reported on *Saccharum* spp.

Ustilago courtoisi Ciferri, Ann. Myc. 29:71. 1931.

*Ustilaginaceae.* Ovaries hypertrophied; spore mass black, 2-3 mm long; spores yellow-brown to brown, more or less spherical or subpolyhedral, 8-12 $\mu$ diam.; epispore smooth, 1-1.5 $\mu$ thick. In florets of *Saccharum* sp. China.

Ustilago sacchari Rabh., Sitzsungsber. Naturwiss. Ges. Isis 4:227. 1870. Sacc., Syll. Fungorum 7:456. 1888. Wakker and Went, Ziekten Suikerriet op Java, pp. 24-36, pl. II. 1898. Dastur, Ann. Bot. 34:391-7, 10 figs. 1920.

*Ustilaginaceae.* Sydow, Ciferri, and others have pointed out that the type specimen is on *Erianthus (Saccharum) ravennae* and is distinct from the smut on true *Saccharum* species. Hence a new name for the latter was proposed. See *U. scitaminea.*

USTILAGO SACCHARI-CILIARIS Bref., Unters. Mykologie 12:109, pl. VI (fig. 26). 1895. Sacc., Syll. Fungorum 14:418. 1899.

*Ustilaginaceae.* Spores globose, 9-11 $\mu$ diam. (7-11 $\mu$ per Ciferri). In ovaries of *Saccharum ciliare (S. sara).* India.

USTILAGO SCITAMINEA Syd., Ann. Myc. 22:281. 1924. Ciferri, Ann. Myc. 29: 71. 1931.

*Ustilaginaceae.* Sori transforming the floral stem into a long curved, leafless, stemlike outgrowth covered by a thin covering of host tissue, the lower part concealed by the sheath; spores reddish brown, globose to subglobose, finely punctulate, 5.5-7.5 $\mu$. (6-10 $\mu$ per Ciferri, l. c.). Attacking living plants of *Saccharum officinarum.* *Smut.*

Belgian Congo, Brazil (?), British Guiana (?), Egypt, Formosa, India, Indo-China, Java, Madagascar, Mauritius, Philippine Islands, Portugal, Portuguese E. Africa, Queensland, Reunion, South China, Union So. Africa. *S. arundinaceum,* China; *S. barberi,* Mauritius; *S. spontaneum,* Java, Philippine Islands, Turkestan. The report of Ustilago on *Saccharum* in New Mexico is an error, *Holcus* being the host involved. Italian reports of *U. sacchari* relate to the fungus on *Erianthus.* Sydow (l.c.) mentions, but does not name, the form on *Saccharum spontaneum,* which is intermediate in spore size (5-6 $\mu$ ).

VALSA SACCHARI Stevenson (In ed.), Jour. Dept. Agric. P. Rico 2:157. 1918.

*Sphaeriaceae.* On dead stalks. Puerto Rico.

VALSARIA SUBTROPICA Speg., Anal. Mus. Nac. Buenos Aires (3)10:372. 1909. Sacc., Syll. Fungorum 22:393. 1913. Averna-Sacca, Bol. Agric. São Paulo 17:613-14, 1 fig. 1916.

*Sphaeriaceae.* Perithecia innate-erumpent, scattered or aggregated in stromata, black, subglobose, 150-200 $\mu$; spores 2-celled, elongate-ellipsoid, slightly constricted at septa, fuliginous, 14-16 $\times$ 5-6 $\mu$. On rotting culms. Argentina, Brazil, Puerto Rico.

*Venturia sacchari* v. Breda de Haan. See *Eriosphaeria sacchari* (v. Breda de Haan) Went

VENTURIA STERILIS Speg., Rev. Fac. Agron. y Vet. 2:230. 1896. Sacc., Syll. Fungorum 14:542. 1899.

*Sphaeriaceae.* Perithecia superficial on lower leaf surfaces and along midribs; asci and spores "non visae." Doubtful species. On dead and dying leaves. Argentina.

VERMICULARIA GRAMINICOLA Westend., Bull. Acad. Roy. Belg. II, 2:566. 1857. Sacc., Syll. Fungorum 3:235. 1884. Spegazzini, Rev. Fac. Agron. y Vet. 2:235. 1884.

*Melanconiaceae.* Sporodochia 120-150 $\mu$ diam.; setae erect, black, 100-200 $\times$ 5-6 $\mu$; conidia hyaline, fusiform, straight or slightly curved, attenuate at

both ends, 2-4 guttulate, 30 × 5 μ (22-30 × 5-6 μ per Spegazzini). On dead and dying leaves. Argentina, Puerto Rico.

Vermicularia sacchari Averna-Sacca, Bol. Agric. São Paulo 17:629, 2 figs. 1916. Sacc., Syll. Fungorum 25:193-4. 1931.

*Melanconiaceae.* Sporodochia globose, 165-275 μ high, 330-500 μ wide, on olivaceous or brown spots; setae copious, up to 1 mm long, acute; conidia cylindrical to curved, continuous, hyaline, 10-13 × 2-3 μ, ciliate at both ends (hence as Saccardo points out does not belong in *Vermicularia).* On culms and leaves. Brazil.

Verticicladium graminicolum Johnston and Stevenson, Jour. Dept. Agric. P. Rico 1:226, pl. XXIX (figs. 14, 15). 1917. Sacc., Syll. Fungorum 25:784. 1931.

*Dematiaceae.* Effuse, forming a dull brown to gray fungus layer; fertile hyphae erect, verticillately branched, 3-4 branches at each node; branches cylindrical; conidia elliptical to cylindrical, hyaline, 6.8-11 × 3-4 μ. On dead leaves. Puerto Rico.

Verticillium sp.

*Moniliaceae.* Unnamed species associated with root rot, top rot, on trash, etc. Hawaii, India, Uganda.

Verticillium glaucum Bon., Handb. Allg. Mykol., p. 97, fig. 120. 1851. Sacc., Syll. Fungorum 4:157. 1888.

*Moniliaceae.* Forming round, blue-green superficial masses; conidia globose, smooth, subhyaline, 2.5 μ diam. On dead leaves. Java.

*Verticillium sacchari* Went See *Hypocrea sacchari* Went

Volutina sp.

*Tuberculariaceae.* An unnamed species on dead canes. Puerto Rico.

Xiphomyces sacchari Syd., Ann. Myc. 14:374. 1916. Sacc., Syll. Fungorum 25:990. 1931. (As *Xyphomyces.)*

*Tuberculariaceae.* Sporodochia .5-1 mm diam., black, often confluent; conidia elongate-cylindrical, yellow-green, continuous, 75-110 × 12-15 μ. On dead leaf sheaths. Philippine Islands.

Xylaria apiculata Cke., Grevillea 8:66. 1879. Sacc., Syll. Fungorum 1:334. 1882.

*Sphaeriaceae.* Fruiting bodies black, stipitate, erect, surmounted by spine-like apiculi, up to 4 cm tall, cylindrical; perithecia immersed, papillate; spores lanceolate, slightly curved, dark brown, 20-22 × 7 μ. On dead canes. Puerto Rico.

Zygodesmus guarapiense Speg., Anal. Soc. Cien. Argentina 22:209. 1886. Sacc., Syll. Fungorum 10:582. 1892.

*Dematiaceae.* Acervuli superficial, black, 2-5 × 1-1.5 mm; conidia globose or angular by compression, smooth, olivaceous, 5-9 × 3-5 μ. On rotten trash. Brazil.

# Sugar Prices

96° CENTRIFUGALS FOR THE PERIOD
JUNE 20, 1938, TO SEPTEMBER 14, 1938

| Date | Per Pound | Per Ton | Remarks |
|---|---|---|---|
| June 20, 1938..... | 2.66¢ | $53.20 | Philippines. |
| " 28..... | 2.68 | 53.60 | Philippines. |
| July 5..... | 2.71 | 54.20 | Puerto Ricos. |
| " 7..... | 2.72 | 54.40 | Puerto Ricos; Cubas. |
| " 11..... | 2.75 | 55.00 | Puerto Ricos; Philippines. |
| " 13..... | 2.80 | 57.60 | Puerto Ricos. |
| " 14..... | 2.85 | 57.00 | Philippines; Cubas. |
| " 20..... | 2.82 | 56.40 | Cubas. |
| " 27..... | 2.80 | 56.00 | Cubas. |
| " 28..... | 2.78 | 55.60 | Cubas. |
| Aug. 1..... | 2.75 | 55.00 | Philippines. |
| " 22..... | 2.80 | 56.00 | Puerto Ricos. |
| " 26..... | 2.90 | 58.00 | Puerto Ricos. |
| " 30..... | 2.915 | 58.30 | Philippines, 2.90; Cubas, 2.93. |
| " 31..... | 2.95 | 59.00 | Puerto Ricos. |
| Sept. 8..... | 2.91 | 58.20 | Philippines, 2.92; Puerto Ricos, 2.90. |
| " 9..... | 2.90 | 58.00 | Cubas. |
| " 13..... | 2.92 | 58.40 | |
| " 14..... | 3.00 | 60.00 | |

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